



National Park Service
U.S. Department of the Interior
Big South Fork National River and Recreation Area
Kentucky and Tennessee

RECORD OF DECISION

Contaminated Mine Drainage Mitigation and Treatment Programmatic and Site Specific
Environmental Impact Statement

Recommended by:

A handwritten signature in blue ink, appearing to read "Niki Stephanie Nicholas".

Niki Stephanie Nicholas
Superintendent
Big South Fork National River and Recreation Area

A handwritten date in blue ink, "March 11, 2019".

Date

Approved by:

A handwritten signature in blue ink, appearing to read "Robert A. Vogel".

Robert A. Vogel
Regional Director, Southeast Region
National Park Service

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Date

for

**U.S. Department of the Interior
National Park Service**

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**Contaminated Mine Drainage Mitigation and Treatment
Programmatic and Site Specific Environmental Impact
Statement**

Big South Fork National River and Recreation Area

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The Department of the Interior (DOI), National Park Service (NPS), has prepared this Record of Decision (ROD) on the final Big South Fork National River and Recreation Area (Big South Fork NRRRA, or “the park”) Contaminated Mine Drainage Mitigation and Treatment Programmatic and Site Specific Environmental Impact Statement (EIS). This ROD has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (NEPA), its implementing regulations (40 CFR 1500-1508), DOI's NEPA regulations (43 CFR 46), and NPS Director's Order 12: Conservation Planning, Environmental Impact Analysis and Decision-making and accompanying handbook. This ROD includes a summary of the purpose and need for action, synopses of alternatives considered and analyzed in detail, a description of the selected alternative, summary of consultation, the basis for the decision, and a description of the environmentally preferable alternative. The selected alternative avoids or minimizes environmental harm within Big South Fork NRRRA. Where potential adverse effects could occur, Big South Fork NRRRA will utilize minimization and mitigation measures to offset remaining effects. Citations can be found in the Reference section of the EIS.

BACKGROUND

The Big South Fork NRRRA is approximately 50 miles northwest of Knoxville, Tennessee and comprises 125,310 acres, with approximately 94,000 acres in Scott, Fentress, Morgan, and Pickett Counties, Tennessee and approximately 31,000 acres in McCreary County, Kentucky. Counties that contain and surround the park consist of scattered, low-density rural development with no major urban areas. When the Big South Fork NRRRA was created, the area had been

subject to long-term intensive land use including coal mining, timber harvesting, oil and gas operations, and impacts from a large network of unmaintained roads.

Extensive coal mining and timber harvesting occurred from the 1800s to the late 1960s and has had substantial environmental impacts to the region, including within the area that is now designated as the Big South Fork NRRA. The Stearns Coal and Lumber Company, which was the largest coal mining company that operated within what is now the Big South Fork NRRA, established a large-scale underground coal mining operation that at its height of operation employed approximately 1,300 coal miners. The Stearns Coal and Lumber Company was founded by J.S. Stearns in the early 1900s.

Coal mining by the Stearns Coal and Lumber Company peaked around 1929, but by 1963 the company began to close their active mines due to the economic decline in the coal market (NPS 1997). Evidence of these past coal mining activities within the park include abandoned coal mines and the waste produced from coal mining activities. The waste materials generated from coal mines were generally deposited in rock dumps near the mines. These coal mine spoil piles and discharge from abandoned mines occur throughout the park and contributes to the formation of contaminated mine drainage (CMD).

Water emanating from coal mines or flowing through spoil piles can become acidified and can mobilize and transport contaminants. Sulfuric acid and ferric hydroxide enter streams at Big South Fork NRRA as water drains from or erodes through the coal mining areas. Other common contaminants arising from acid mine runoff include aluminum, cadmium, cobalt, copper, iron, magnesium, manganese, and zinc. Consequently, some streams in Big South Fork NRRA are severely impacted habitats with limited ability to support aquatic life.

Since 1974, some remedial efforts have been made to minimize the effect of mine spoils on surface waters. The recently completed efforts in the Big South Fork NRRA at Blue Heron were funded by the U.S. Army Corps of Engineers (USACE). Additional reclamation activities have been completed within the Big South Fork River watershed, but outside of the Big South Fork NRRA, by Tennessee Department of Environment and Conservation (TDEC), the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and Kentucky Division of Abandoned Mine Lands.

Eight specific CMD locations were selected for remediation in the EIS. These CMD sites are located along the Big South Fork River approximately five miles north of the Kentucky/Tennessee border in McCreary County, Kentucky. These sites vary in size, and restoration will result in approximately 55 acres of total disturbance, including the access that will be required to remediate the sites. The CMD sites currently discharge into tributaries of the Big South Fork NRRA or flow directly into the river through mine discharges or through spoil piles.

The locations of all potential programmatic sites are not currently known, as additional sites may be discovered in the future; however, some potential site locations are known and have been mapped as a part of previous acid mine drainage mapping within the park. These sites were determined from an NPS database, which includes potential CMD occurrences from previous documentation, surveys, and the Abandoned Mineral Lands (AML) Comprehensive Inventory

and Assessment. The potential CMD occurrences utilized for the programmatic sites were selected because they were denoted as “action required”, “high risk”, or “effluent [discharge]” within the database. Potential CMD occurrences were grouped together into a programmatic site if the occurrences could have shared access and were in the immediate vicinity of one another (e.g., 2 adjacent spoil piles).

PURPOSE OF THIS FINAL EIS

The purpose of the Contaminated Mine Drainage Mitigation and Treatment Programmatic and Site Specific EIS is to develop a programmatic approach and guidance for the Big South Fork NRRRA to improve water quality through the remediation of CMD sites in a manner that protects resources, visitor use/experience, and human health and safety in Big South Fork NRRRA. The EIS will provide Big South Fork NRRRA a broad framework to remediate CMD locations throughout the park. In addition to providing a framework for treatment at other sites within the park, eight specific CMD sites have been analyzed in greater detail in the EIS. These eight sites were identified in previous investigations as being high priority sites to be considered for treatment.

NEED FOR ACTION

Water quality and the health of aquatic habitats in the Big South Fork River and its tributaries have been adversely impacted by contaminated water discharging from CMD sites. The EIS is needed to identify appropriate CMD remedial technologies and to provide an efficient strategy for park managers to limit or prevent CMD and ultimately improve water quality in the Big South Fork River and tributary streams. Mitigation and treatment of CMD will improve aquatic systems and resources and likely improve wildlife habitat, natural ecosystems, and visitor experience within the park.

TERMINOLOGY

Contaminated Mine Drainage (CMD) - CMD occurs from sulfuric acid and ferric hydroxide runoff at active and abandoned coal mining sites. During coal mining, acid is formed by the oxidation of the pyrite in tailings exposed during mining activities, resulting in increased acidity, and increased heavy metals and other contaminants in waters and sediments. CMD can also cause a sterile coating of ferric hydroxide on a stream substrate known as “yellow boy”. Yellow boy is a yellow-orange solid comprised of previously soluble iron ions precipitated as iron hydroxide when the pH of CMD is raised past 3, either through contact with fresh water or neutralizing minerals. Impacts on water quality from coal mining include siltation of streams and CMD.

Active Treatment System - Active treatment systems improve water quality using chemicals to treat CMD. Chemicals used in active treatment systems include calcium carbonate (limestone), calcium hydroxide (hydrated lime), sodium carbonate (soda ash), and sodium hydroxide (caustic soda) (Gannett Fleming, Inc. 1998). The size and complexity of active systems, and the chemicals used to treat CMD are influenced by initial water quality, desired or required water quality, site topography, and costs associated with operations and maintenance (O&M). Active treatment systems generally require frequent O&M.

Passive Treatment System - Passive treatment systems use chemical, biological, and hydrological designs that can remove CMD contaminants and raise the pH in CMD (Gannett

Fleming, Inc. 1998). This remedial approach successfully treats CMD at sites with a pH greater than 4.5, but has limitations at CMD sites with a pH of less than 4.5. While passive treatment systems may require more area than active treatment systems for wetland cell construction, they are engineered to have a low O&M requirement, usually requiring dredging every 10 to 30 years.

Source Control - Source control is a remedial approach that prevents or controls the initial creation of CMD by separating one or more of the three primary components of CMD (air, water, or pyritic materials) from coming into contact with each other; source control is the only remedial approach that prevents the generation of CMD. Other approaches treat CMD, but do not address the source, and therefore have long or unending operational lifespans. Source controls can include the removal of spoil pile material, capping of spoil pile material, water source diversion from acid-producing materials and environments, and mine seals. Mine seals consist of the physical sealing of mine openings to prevent oxygen (air) from contacting water and/or pyritic materials.

ALTERNATIVES CONSIDERED

These alternatives were developed to meet the stated purpose and need and provide a reasonable range of options for the mitigation and treatment of CMD sites. As described below, access to remediate potential CMD sites is the element that varies the most among the alternatives, and subsequently has the largest effect on the variation of impacts between the alternatives. Allowable access under an alternative represents the largest required disturbance footprint for access that could be implemented for that alternative.

ALTERNATIVE 1: NO REMEDIATION

Under the No Remediation alternative, current conditions and management strategies for treating CMD sites would remain unchanged. The park may periodically monitor these sites. If the No Remediation alternative is selected, CMD sites would continue to produce contaminated water, and poor water quality would persist in many of the tributary streams, surface waters, and the Big South Fork River within the park. Under the No Remediation alternative, no action would be planned, and NPS would initiate remediation on a case by case basis.

ALTERNATIVE 2: FULL ACCESS

Under Alternative 2, the park would have full access to remediate potential CMD sites. As access would not be limited, most programmatic CMD sites (approximately 17 based on current information on the locations of CMD sites within Big South Fork NRRRA), could be accessed for remediation. Additionally, all 8 specific CMD sites could be remediated. NPS would clearly articulate the programmatic management framework to remediate CMD sites located within Big South Fork NRRRA and to ensure long-term protection of the park resources and values. NPS would ensure that park resources are protected during the construction of new access, maintained access, upgrades of existing access, and the CMD remedial approach and its necessary O&M activities.

ALTERNATIVE 3: MODERATE ACCESS

Under Alternative 3, NPS could use existing routes identified in the current General Management Plan (GMP) with the ability to widen routes for CMD construction and long-term maintenance, use and improve historic access routes, and construct up to 0.1 mile of new access road to sites. Hiking and mountain biking trails, may not be utilized for access unless the trail is co-located on a historic logging road, or mining road. Historic tramways are excluded. There are no access restrictions on existing spoil areas. As access would be somewhat limited (where there are no limitations to access under Alternative 2), not all treatable CMD sites could be accessed for remediation under Alternative 3. An estimate of up to 8 programmatic CMD sites could be remediated under the programmatic implementation of Alternative 3 for the purposes of evaluation in the EIS. Additionally, only 5 of the specific CMD sites could be remediated. NPS would actively implement CMD technology using all suitable CMD technologies and O&M as required.

ALTERNATIVE 4: MINIMAL ACCESS

Under Alternative 4, the NPS could use existing roads and larger access routes identified in the current GMP, such as horse trails and multiple use trails, and construct new access roads to sites that are less than 0.1 mile in length, but could not use historic access routes, such as former logging roads or tramways, or smaller access routes, such as hiking or mountain biking trails. Access improvement standards would be consistent with those described for Alternative 3. As access would be very limited, much more so than under Alternatives 2 or 3, most CMD sites could not be accessed for remediation. An estimate of up to 6 CMD sites could be remediated under the programmatic implementation of Alternative 4 for the purposes of evaluation in the EIS. Additionally, only 4 of the specific sites could be remediated. Under Alternative 4, the NPS would actively treat CMD using suitable remedial technologies that have a low, infrequent, and/or minor O&M, and would have a preference for passive remedial approaches.

SELECTED ALTERNATIVE

To identify the preferred alternative, NPS evaluated each alternative on its ability to best meet the plan's purpose and need, while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. The NPS selected alternative is Alternative 3, which is also the environmentally preferable alternative.

As previously noted, an estimate of up to 8 programmatic CMD sites could be remediated under the programmatic implementation of Alternative 3. Additionally, only 5 of the 8 specific CMD sites could be remediated (Worley Mine #86, Nancy Grave Site, Laurel Branch Confluence Site, Laurel Branch Spoils Site, and the Blair Creek Site). Worley Mine #88, Slavey Hollow, and Devils Creek sites will not be accessible, and remediation of these areas will not occur. NPS will actively implement CMD technology using all suitable CMD technologies and O&M as required.

Alternative 3 provides the use of existing historic routes that already impacted the environment during construction and allows for new construction to a site, but new construction will be limited to 0.1 mile. Under Alternative 3, access will use existing access (trails or roads) where possible, with NPS making minor improvements or upgrades to provide an even surface for trucks and

mechanized equipment. However, under Alternative 3, hiking and mountain biking trails will not be utilized for access (unless the trail is co-located on a historic logging or mining road). Minor improvements to existing access could include the filling of mud holes and/or the filling of small washouts and large ruts. Following the completion of the proposed remediation measures, the proposed access route will be restored to the existing width according to NPS trail standards and to accommodate future O&M activity; however, gravel and rock placed for surface improvements may be left within the trail surface and/or removed to a designated area. Side banks will be replanted using the NPS recommended planting list of native plants. During construction, temporary erosion control measures will be installed on access roads and trails per NPS best management practices (BMPs).

In addition to the elimination of mountain biking and hiking trails for access, access will be limited to 0.1 miles of new, temporary roads and trails for use during the construction phase of each remedial project. This differentiates Alternative 3 from Alternative 2, which will have no limitations on the length of new access that could be constructed, and could use mountain biking and hiking trails for access. The standards applied to these temporary roads will not exceed those standards of the Class 6 (non-public) administrative roads. The GMP defines these standards as a width of 8-12 ft, 12-16 ft cleared right-of-way and a 12-ft cleared height. Temporary roads will be gated off and will not be maintained after the construction of the remedial approach is completed by the NPS. Temporary roads may be reopened for a short time period (less than a month) to perform O&M as required. Temporary access roads that are opened to perform O&M will follow the same standards as temporary roads that were constructed during the installation of the remedial approach.

BASIS FOR DECISION

To identify the preferred alternative, the planning team evaluated each alternative based on its ability to meet the plan's purpose and need, NPS statutory mission and responsibilities, and the potential impacts on the environment, while giving consideration to economic, environmental, technical, and other factors. Refer to Environmental Consequences (Chapter 4) and Alternatives Impacts Summary (Table 2-6) of the EIS. Alternative 3 was identified as the NPS preferred alternative.

Alternative 3 fully meets the purpose and need, protects resources from adverse effects of CMD, while also minimizing impacts from construction, access, and O&M costs, and providing water quality benefits from CMD remediation. While Alternative 2 also fully meets remediation objectives, it would have greater impacts associated with construction, access, and O&M costs. Alternative 4 best minimizes the impacts from construction, access, and O&M costs by limiting the number of CMD sites available for remediation, but this also limits the water quality benefits from CMD remediation. Alternative 1, the no-action alternative, would not meet the purpose and need.

NPS will select appropriate remediation technologies after additional data collection at each site, and accounting for site access, source geology, and other site characterization data and specific remediation requirements. Future tiered documents would address uncertainties associated with coal mine remediation, if any, including the fate and transfer of chemical by-products. NPS may

also consult with the Department of Energy's National Energy Technology Laboratory regarding additional treatment technologies as recommended by the EPA. Other agencies for consultation include but are not limited to, United States Geological Survey (USGS), Office of Surface Mining (OSM), United States Army Corps of Engineers (USCOE), Tennessee Valley Authority (TVA), and United States Forest Service (USFS). Prior to any remedial activity, the NPS would obtain required permits and comply with NEPA and other applicable laws on a case by case basis as funding becomes available to treat CMD at individual sites.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

NPS is required to identify the environmentally preferable alternative in its ROD and may identify it in an EIS. Guidance from the Council on Environmental Quality (CEQ) states that the environmentally preferable alternative is "the alternative that causes the least damage to the biological and physical environment: it is also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ 1981). The environmentally preferable alternative would be Alternative 3. It minimizes impacts from construction, access, and O&M costs, while still providing water quality benefits from CMD remediation.

CONCLUSION

Overall, of the four alternatives considered in detail in the EIS, the selected alternative best meets the purpose and need of the EIS and is expected to support the long-term protection, preservation, and restoration of the resources and values of Big South Fork NRR. The impacts related to the implementation of the selected alternative will not violate the NPS Organic Act or any other applicable law, and implementation of the selected alternative will allow Big South Fork NRR to protect its resources and values for enjoyment of current and future generations.

The required "no-action period" before approval of the ROD was initiated on January 17, 2017, with the EPA's Federal Register notification of the filing of the final EIS (78 FR 12353). The official responsible for implementing the selected alternative is the Superintendent of Big South Fork NRR.

Attachment A

Non-Impairment Determination for the National Park Service Selected Alternative

Big South Fork National River and Recreation Area Contaminated Mine Drainage Mitigation and Treatment Programmatic and Site Specific Environmental Impact Statement

INTRODUCTION

Pursuant to the NPS Guidance for Non-Impairment Determinations and the NPS NEPA Process, a non-impairment determination for the selected alternative is included here as Attachment A to the ROD.

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the DOI and the NPS to manage units “to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (54 U.S.C. 100101).

NPS *Management Policies 2006*, section 1.4.4, explains the prohibition on impairment of park resources and values:

While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the National Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

An action constitutes impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise will be present for the enjoyment of those resources or values” (NPS *Management Policies 2006*, section 1.4.5). To determine impairment, the NPS must evaluate the “particular resources and values that will be affected;

the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts” (section 1.4.5).

National park system units vary based on their enabling legislation, natural and cultural resources present, and mission. Likewise, the activities appropriate for each unit and for areas in each unit also vary. For example, an action appropriate in one unit could impair resources in another unit.

As stated in the *NPS Management Policies 2006* (section 1.4.5), an impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified in the park’s general management plan or other relevant NPS planning documents as being of significance.

The significance and importance of each resource, based on the enabling legislation and recently completed foundation document for the Big South Fork NRRRA, is discussed under the analyzed resource sections below.

The resource impact topics carried forward and analyzed for the NPS selected alternative in the EIS and for which an impairment determination is contained in this attachment are topography and soils, water resources, biological resources, cultural resources, and soundscapes and the acoustic environment. A non-impairment determination is not made for visitor use and experience because they are not generally considered to be park resources or values subject to the non-impairment standard established by the Organic Act and clarified further in Section 1.4.6 of *NPS Management Policies 2006*. Each resource or value for which non-impairment is assessed and the reasons why impairment will not occur is described below.

TOPOGRAPHY AND SOILS

The Big South Fork NRRRA topography is dominated by a deep gorge, created by the Big South Fork River and its tributaries. In addition to the natural processes of the gorge, topography throughout the gorge has been altered by historic mining activities, including mine tailing and spoil piles present at many of the CMD sites, and former tramways and historic extraction roads throughout the park. Topography in the park also includes such geologic features as rock houses, canyons, buttes, windows, chimneys, waterfalls, and arches; and dramatic or unusual rock outcrops and formations.

Soils in the vicinity of the project sites are dominated by two major soil associations: Tate-Shelocta association and the Tate-Trappist association. The predominantly loamy soils range

from about one foot in depth on steep hillsides to about four to five feet deep on interstream divides.

The park's geologic qualities and features are necessary to fulfill the purposes for which the park was established and are key to the natural integrity of the park. Geologic resources and geologic features of the park, including the gorges, bluffs, cliff lines, arches, and other geologic formations, are specifically identified in the park's enabling legislation and planning documents.

Actions in the preferred alternative include CMD remediation that could cause both short-term and long-term adverse impacts to soils and geological features. The construction, maintenance, and use of access roads and remediation systems could erode, compact, and rut soils, reduce soil permeability, and releases of hazardous or contaminating substances by leaking equipment or spills during construction or operation could adversely affect soils. However, the new management framework for CMD will promote efficient operation to applicable standards, while adherence to Best Management Practices (BMPs) is designed to avoid, minimize, and/or mitigate these impacts (e.g., buffer zones, silt fencing and sediment barriers, temporary sediment basins, soil stabilization, matting or cribbing, post-construction grade restoration, revegetation, etc.). Impacts could be locally adverse, but the disturbed areas would only represent approximately 0.1% of the park's acreage. In addition, remediating CMD would have a long-term beneficial impact on soils.

Overall, adverse impacts to geology and soils will be relatively limited given the scale of the potential impacts and appropriate mitigation, and will be offset by the remediation of CMD and the associated reclamation of previously disturbed lands. Additionally, the contribution to overall adverse cumulative impacts will be limited. As a result, there will be no impairment of geology and soils under Alternative 3.

WATER RESOURCES

The importance of water resources is highlighted in the Big South Fork NRRRA purpose statement, which states that the NRRRA was established to preserve the free-flowing Big South Fork River, portions of its tributaries, and the natural integrity of the gorge. The Big South Fork River is formed by the New River and the Clear Fork, and drains the northern portion of the Cumberland Plateau in Tennessee. As the Big South Fork flows from south to north, it is fed by a variety of sources ranging from perennial streams to many ephemeral creeks.

Water resources in the context of the EIS include water quality, floodplains, wetlands, and groundwater resources and withdrawal. The park's water resources are necessary to fulfill the purposes for which the park was established and are key to the natural integrity of the park. The significance of Big South Fork NRRRA includes the free-flowing river system with a wide variety of habitats, including a world-class mussel assemblage. The Big South Fork River is designated as a Tier III Outstanding Natural Resource Water under the Clean Water Act.

Actions in the preferred alternative include CMD remediation that could cause both short-term and long-term adverse impacts to water resources. The implementation of remedial

approaches would result in impacts mainly from disturbance for access and construction, resulting in road and site runoff, along with the crossing of wetland areas and streams. Planning and adherence to BMPs would avoid, minimize, and mitigate these impacts, and remediation would not be permitted in wetlands, floodplains or streams, unless there was no practicable alternative. The short-term impacts could be significant, but through the use of BMPs, would be mitigated. Long-term adverse water quality impacts would be limited to a small percentage of park land and streams from operations and access, and would be offset by significantly improved water quality at remediated sites. The remediation would have a long-term beneficial impact on water resources by increasing pH and lowering dissolved solids, suspended solids, turbidity, conductivity, trace metals, and other contaminants associated with CMD.

Taking into consideration the effects of CMD remediation on water resources under the selected action, adverse impacts to water resources will be limited or controlled given appropriate mitigation through the use of BMPs (described in Appendix F of the EIS), and there will be significant beneficial effects to water quality, wildlife/aquatic habitat, natural ecosystems, and visitor experience from the treatment of CMD. Additionally, the contribution to overall adverse cumulative impacts will be limited. As a result, there will be no impairment of water resources under Alternative 3.

BIOLOGICAL RESOURCES

The park relies on natural processes to control populations of native species to the greatest extent possible, and has management goals for wildlife, including maintaining components and processes of naturally evolving park ecosystems. However, CMD caused by anthropogenic activities is impacting biological resources within Big South Fork NRR. The intention of remediation would be to rehabilitate CMD impacted areas similar to a natural condition, and allow for biological resources to recover naturally. Biological resources, in the context of the EIS, include vegetation, wildlife and aquatic species, and special status species and special habitat areas.

The Big South Fork River watershed is a national focus for major conservation efforts because of its aquatic and terrestrial features. The Big South Fork River is particularly significant in that it harbors at least 42 species of mussels, of which there are eleven federally listed or candidate mussel species which occur in the river. Three fish, two river-dependent plants, and two upland plants are also federally listed. Federally listed bats documented within Big South Fork NRR include northern long-eared bats and gray bats, and a single Indiana bat observed during a survey in 1981. The observed Indiana bat is thought to be a transient migrant, as there are no known Indiana bat hibernacula or roost trees within the park. In addition, the Big South Fork NRR contains 85 known state-listed threatened and endangered plant species. The various construction activities associated with accessing and treating CMD could affect these resources.

Remediation that could impact special status species and special habitat areas under each of the action alternatives is subject to Section 7 of the Endangered Species Act (ESA). Section 7 (a) (2) requires federal agencies to ensure their actions do not jeopardize the continued

existence of federally listed species or adversely modify any critical habitat. NPS has consulted with the US Fish and Wildlife Service (USFWS) under Section 7 for the programmatic approach presented in this plan, including specifically identified remediation sites. Prior to the implementation of a site-specific remedial approach, NPS would again conduct ESA consultation with the USFWS, as appropriate, to ensure compliance with Section 7.

Actions in the preferred alternative include CMD remediation that could cause both short-term and long-term adverse impacts to biological resources. The implementation of remedial approaches would result in short-term impacts on biological resources, mainly from construction of access routes and remedial sites, resulting in road and site runoff, along with the crossing of wetland areas and streams. In addition, planning and adherence to Section 7 and BMPs would avoid, minimize, and mitigate these impacts. Long-term adverse impacts to biological resources would be limited to a small percentage of park land and streams from operations and infrequent access. Short and long-term adverse impacts would not be significant as impacts would have appropriate specific mitigations or through the use of BMPs. In addition, remediating CMD would provide significant long-term beneficial effects to wildlife/aquatic habitat and natural ecosystems.

Overall, adverse impacts to biological resources will be relatively limited given scale and appropriate mitigation and will be offset by the remediation of CMD and the associated reclamation of previously disturbed lands. As a result, there will be no impairment of biological resources under Alternative 3.

CULTURAL RESOURCES

One of the primary reasons the Big South Fork NRR was established was to protect the cultural heritage of Cumberland Plateau and the record of human habitation contained therein. Humans have occupied the area for approximately 12,000 years, and the park contains a rich and diversified cultural context. Archeological resources include ancient rock shelters, seasonal hunting camps, and more modern gristmills, moonshine stills, coal mines and saltworks. Historic structures and resources in the park include farmsteads, transportation routes, mines, and other engineering structures, and many are listed on or eligible for inclusion on the National Register of Historic Places (NRHP).

Cultural resources meeting the eligibility criteria for listing on the NRHP are considered “significant” resources and must be taken into consideration during the planning of federal projects, and are part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America’s historic and archeological resources.

Actions in the preferred alternative include CMD remediation that could cause adverse impacts to cultural resources. Disturbances occurring from access and implementation of a remedial approach would largely be located in previously disturbed areas; however, some of these areas could be associated with cultural resources from the previous mining or occupation of Big South Fork NRR. These impacts would be avoided or mitigated through surveys and National Historic Preservation Act (NHPA) Section 106 compliance, through consultation with the SHPO. If buried cultural resources cannot be avoided, impacts would be mitigated by cultural resources

oversight, through recovery of data (excavation), preservation of recovered materials, and associated records.

Overall, adverse impacts to cultural resources will be relatively limited given appropriate mitigation. Additionally, the contribution to overall adverse cumulative impacts will be limited. As a result, there will be no impairment of cultural resources under Alternative 3.

SOUNDSCAPES AND THE ACOUSTIC ENVIRONMENT

The natural sounds within a park unit are frequently cited as an important part of the visitor experience, and protecting parks from high levels of intrusive sounds is a growing concern. Although no formal studies of the park's acoustic environment have been conducted, using data from the Great Smoky Mountains, it is assumed that ambient sounds range from 26 to 43 dBA. These sound levels are a mixture of natural sounds associated with forest and shrubland habitats. The natural soundscapes of Big South Fork NRR are affected primarily by vehicular noise, both inside and outside the park boundaries. Oil and gas exploration and production also affect the natural soundscape locally and for limited periods of time.

Impacts on the natural soundscape were assessed based on impacts during construction at CMD sites, as well as periodic O&M activities. The specific activities associated with each activity were evaluated and used to determine the degree of impact associated with CMD remediation relative to natural ambient sound levels within the park units. Data collected at Great Smoky Mountains National Park was used as a comparison for estimating the natural ambient sound levels within Big South Fork NRR since the natural soundscape has not previously been studied at Big South Fork NRR. Noise levels generated from common construction equipment are provided in Table 4-2 of the EIS.

The implementation of remedial approaches would result in small short-term and long-term adverse impacts on soundscapes, particularly to the natural backcountry soundscapes, from noise generated during construction and periodic maintenance activities. To mitigate impacts, the park will coordinate maintenance activities to ensure sites undergoing maintenance are separated spatially and temporally, when possible, so as not to amplify effects to soundscapes. NPS would also implement standard noise abatement measures during construction, maintenance, and for vehicle access.

Overall, adverse impacts to soundscapes will be relatively minimal and short-term, given appropriate mitigation. Additionally, the contribution to overall adverse cumulative impacts will be limited. As a result, there will be no impairment of soundscapes under Alternative 3.

SUMMARY

The NPS has determined that implementation of the selected alternative will not constitute an impairment of the resources or values of the park. This conclusion is based on consideration of the park's purpose and significance, a thorough analysis of the environmental impacts described in the EIS, comments provided by the public and others, and the professional judgment of the decision maker guided by the direction of the NPS *Management Policies 2006*.