

**United States Department of the Interior
National Park Service**

Great Smoky Mountains National Park

**Rehabilitation of Water and Wastewater Systems at Balsam
Mountain Campground and Heintooga Picnic Area
Environmental Assessment**

July 2022

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SUMMARY

The National Park Service (NPS) is proposing to rehabilitate water and wastewater systems at the Balsam Mountain Campground and Heintooga Picnic Area in Great Smoky Mountains National Park. Located at about 5,300 feet in elevation, the campground and picnic area are open seasonally, typically mid-May through mid-October. The campground has 46 individual campsites and 2 comfort stations (restrooms). The picnic area has 41 sites and 2 comfort stations. The campground and picnic area consist of about 50 acres and are within the General Park Development Zone identified in the Park's General Management Plan (NPS 1982).

The purpose of the project is to provide reliable and effective water and wastewater systems to serve the Balsam Mountain Campground and Heintooga Picnic Area. The project is needed because the water and wastewater systems were built in 1953-1955 and require rehabilitation to protect human health and safety. The proposed action is also needed to reduce system maintenance requirements and the incidence of system failures.

The NPS has prepared an Environmental Assessment (EA) to assess the impacts of the potential rehabilitation of the water and wastewater systems serving the campground and picnic area. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality's (CEQ) Implementing Regulations for NEPA (2022).

This EA analyzes two alternatives, no action (Alternative 1) and the proposed action (Alternative 2 and the NPS preferred alternative). Water system improvements proposed under Alternative 2 include:

- Replacing approximately 9,450 linear feet of existing waterline within the campground and picnic area.
- Replacing the existing well pump.
- Rehabilitating the existing 30,000-gallon below ground water storage tank by lining it with a polyethylene coating and replacing existing piping and valves.
- Installing chain link fencing around the water tank and well pump to provide physical security for the water system.
- Constructing a new, approximately 0.25-mile gravel water tank access road.

Wastewater system improvements proposed under Alternative 2 include:

- Replacing approximately 850 linear feet of sewer line connecting the campground comfort stations to the existing sand filter treatment system and conducting minor grading to improve site drainage.
- Installing two new conventional septic systems, one for each picnic area comfort station.

Reserve drain fields totaling approximately 1 acre have also been identified as part of Alternative 2. All or part of the reserve drain fields could be used in the future if soils in the primary drain fields can no longer function properly. For analysis purposes, it is assumed that the reserve areas would not be used for at least 10 years. Any future use of the reserve areas would be subject to further analysis in accordance with NPS policies and NEPA.

This document has been prepared in accordance with NEPA; regulations of the Council on Environmental Quality (40 Code of Federal Regulations 1500–1508); NPS Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2011); and the NPS *NEPA Handbook* (2015).

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Note to Reviewers and Respondents:

If you wish to comment on this EA, you may post comments electronically at <http://parkplanning.nps.gov> (NPS preferred method). You may also mail comments to the address above. Comments must be received within 15 days of the release of the EA. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that under provisions of the Freedom of Information Act the entire comment, including your personal identifying information, may be made publicly available at any time. Although you can ask in your comment to withhold your personal identifying information from public review, NPS cannot guarantee that it would have the legal authority to do so.

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

The National Park Service (NPS) is proposing to rehabilitate water and wastewater systems at the Balsam Mountain Campground and Heintooga Picnic Area in Great Smoky Mountains National Park (Park), Swain County, North Carolina (Figure 1). Located at about 5,300 feet in elevation, the campground and picnic area are popular visitor destinations and are open seasonally, typically mid-May through mid-October. The campground has 46 individual campsites and 2 comfort stations (restrooms). The picnic area has 41 sites and 2 comfort stations. The campground and picnic area consist of about 40 acres and are within the General Park Development Zone identified in the General Management Plan (NPS 1982).

The existing water system serving the campground and picnic area (Figure 2) includes a well, pump house, chlorination system, 30,000-gallon underground water storage tank, and associated underground water mains and water distribution lines. The campground wastewater system consists of underground sewer lines, a 5,000 gallon septic tank, a dosing tank, and two sand filters with a subsurface effluent dispersal system. The picnic area wastewater system consists of underground sewer lines, a 3,000-gallon septic tank, and subsurface conventional drain field.

The NPS has prepared an Environmental Assessment (EA) to assess the impacts of the potential rehabilitation of the water and wastewater systems serving the campground and picnic area. This EA was completed in accordance with the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Implementing Regulations Revisions, 87 Fed. Reg. 23466 (April 20, 2022).

PURPOSE OF THE ACTION

The purpose of the proposed action is to provide reliable and effective water and wastewater systems to serve the Balsam Mountain Campground and Heintooga Picnic Area.

NEED FOR THE ACTION

The water and wastewater systems serving the Balsam Mountain Campground and the Heintooga Picnic Area were built in 1953-1955 and require rehabilitation to ensure the systems continue to function properly. Rehabilitation of the systems is needed to protect human health and safety by continuing to provide safe drinking water and proper wastewater treatment and disposal. The proposed action is also needed to reduce system maintenance requirements and the incidence of system failures such as waterline breaks, which can lead to temporary closure of the campground or picnic area.

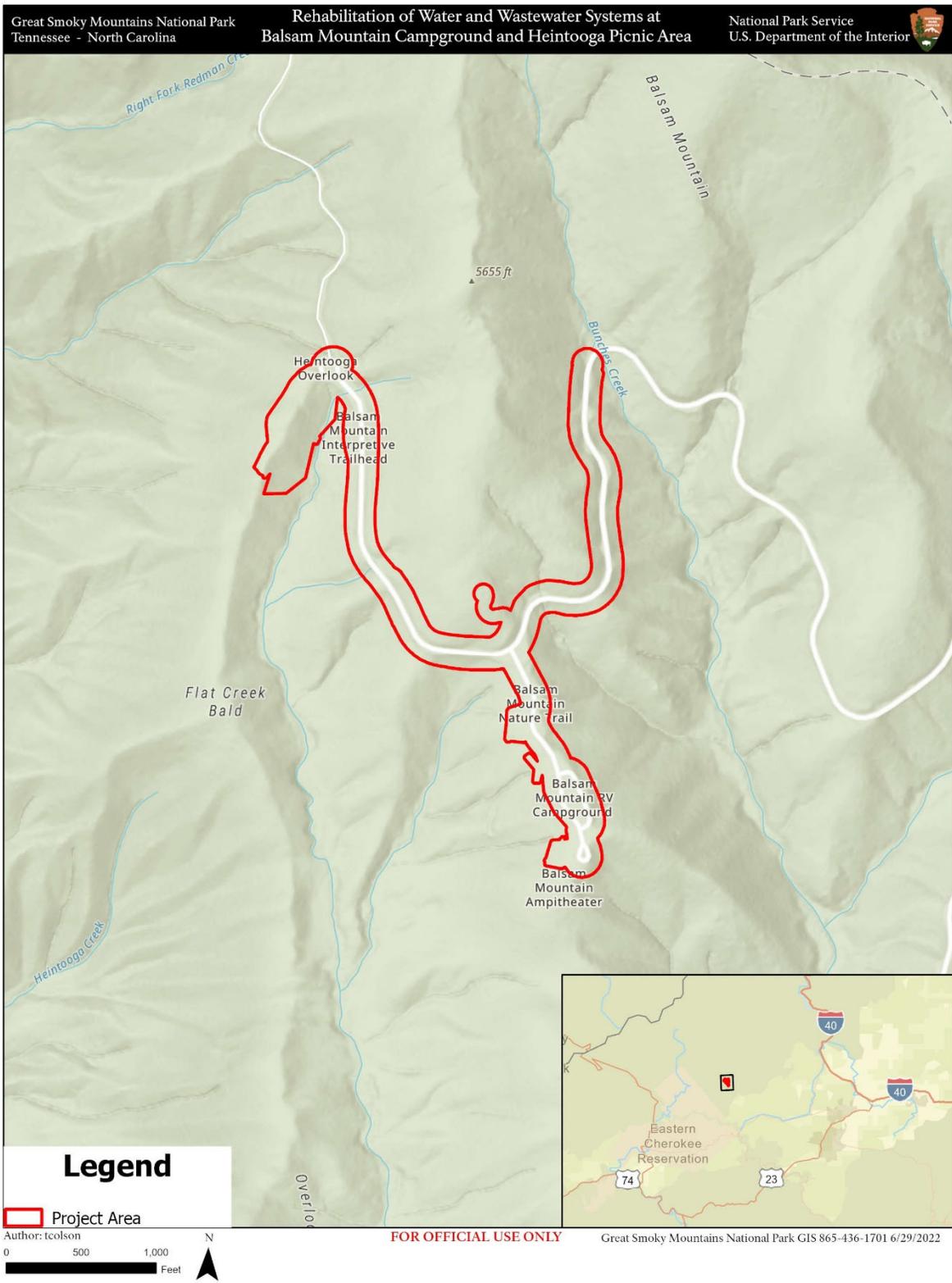


Figure 1: Project Location Map, Balsam Mountain Campground and Heintooga Picnic Area in Great Smoky Mountains National Park (Park), Swain County, North Carolina.

CHAPTER 2: ALTERNATIVES

ALTERNATIVE 1: NO ACTION

CEQ defines the no action alternative as the alternative that represents no change from current management. Analysis of the no action alternative provides a baseline of continuing with the present course of actions (CEQ 1981). Under the no action alternative, NPS would continue to operate the existing water and wastewater systems at Balsam Mountain Campground and Heintooga Picnic Area and would not rehabilitate the systems. Routine maintenance and repairs would continue to be performed as needed. The risk of component failure would increase over time as the systems continue to age. Failure of wastewater systems may possibly result in natural resource degradation or temporary closures of the campground or picnic area.

ALTERNATIVE 2 – PROPOSED ACTION AND NPS PREFERRED ALTERNATIVE

OVERVIEW

Under Alternative 2, NPS would rehabilitate the existing water and wastewater systems serving the Balsam Mountain Campground and Heintooga Picnic Area. Construction would be scheduled during the campground and picnic area closed season (mid-October to mid-May) to the extent possible to minimize impacts to visitors. Details of the proposed work is discussed below.

WATER SYSTEM REHABILITATION

Alternative 2 includes replacement of approximately 9,450 linear feet of existing waterline within the campground and picnic area as depicted in Figure 2. The diameter of new waterlines would range from ¾-inch service lines to 4-inch mains. Most of the water line replacement would be in-kind within the existing trench, but minor deviations from existing alignments could be needed in a few locations. Temporary ground disturbance associated with installation of the new waterlines would consist of excavating trenches 3-4 feet deep and up to 36 inches wide. The total area of temporary disturbance for waterline installation would be approximately 0.7 acres. Most of the excavation would be in maintained grassy areas adjacent to existing roads and no tree clearing is anticipated. New isolation valves would be installed within the same area of disturbance as the waterlines. Trenches would be returned to original grade and seeded with a Park-approved seed mix as the waterline installation is completed.

Alternative 2 also includes replacement of the existing well pump and rehabilitation of the existing 30,000-gallon below ground water storage tank (Figure 2). The existing well pump is housed in a below grade sump near the pump house. The new pump would be installed in the same general location on an approximate 4x4-foot concrete slab and would be housed in fiberglass pump cover. Rehabilitation of the water tank would consist of lining it with a polyethylene coating and replacing existing piping and valves, which would require excavation around the tank. The area adjacent to the tank would be cleared of trees and brush to provide construction access and to provide a clear zone around the tank for long-term maintenance and protection of the tank. Chain link fencing would be installed around the water tank and well pump to provide physical security for the water system. Fencing materials would be brown, green, or black depending on availability to blend with the natural environment. The total area of disturbance and tree clearing for the tank and well pump work would be less than 0.1 acre. The disturbed areas would be seeded with a Park-approved seed mix when the work is complete and would be maintained to prevent regrowth of trees.

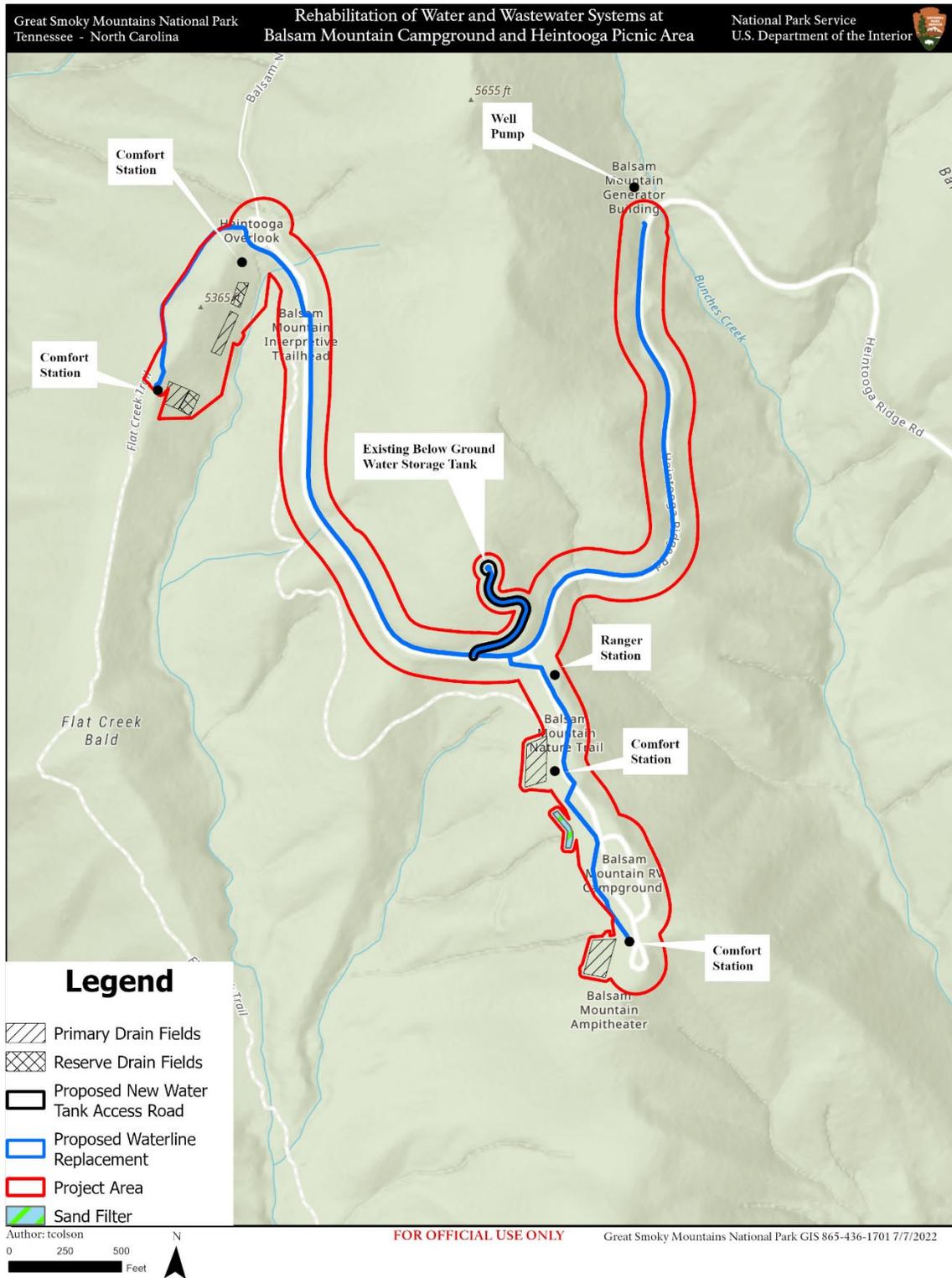


Figure 2: Location of the Proposed Action (Alternative 2), Rehabilitation of Water and Wastewater Systems at Balsam Mountain Campground and Heintooga Picnic Area

Currently, the only access to the water tank is a footpath. At one time the water tank was accessed by a 0.7-mile dirt road that begins at the existing pump house. This old road has not been used in approximately ten years, is overgrown, and is currently unusable. Restoration of the old road is not feasible or desirable because of apparent shifting of a small stream and earth slides above the road. Therefore, Alternative 2 includes construction of a new, shorter (about 0.25 miles) water tank access road (Figure 2). The new road would provide construction access and safe access for long-term maintenance of the water tank. The new 18-foot wide road would be gravel and pass through a forested area. Approximately 0.6 acres of ground disturbance and tree clearing would be required for construction of the road. The road would be designed for proper stormwater drainage.

WASTEWATER SYSTEM REHABILITATION

At the campground, Alternative 2 includes replacement of the sewer lines connecting the two comfort stations to the existing septic tank/sand filter system. Approximately 850 linear feet of 6-inch diameter sewer line would be replaced using pipe bursting, a technology that minimizes ground disturbance.

Pipe bursting is a method by which the existing pipe is opened and forced outward by a bursting tool. A hydraulic or pneumatic expansion head (part of the bursting tool) is pulled through the existing pipeline, typically by using a cable and winch. As the expansion head is pulled through the existing pipe, it pushes that pipe radially outward until it breaks apart, creating a space for the new pipe. The bursting device also pulls the new pipeline behind it, immediately filling the void created by the old, burst pipe with the new pipe (USEPA 2006). Ground disturbance associated with the pipe bursting would consist of excavating approximately 6 to 8 existing sewer manholes to allow access to the existing sewer line and for operation of the equipment. Each excavation would be about 6 feet in diameter and the total area of disturbance for pipe bursting would be about 225 square feet (0.005 acres). No tree clearing is anticipated for the sewer line replacement.

An approximately 0.1-acre area upslope of the existing sand filter system would be regraded and seeded to repair erosion, improve stormwater drainage, and direct stormwater away from the sand filter. A few trees would need to be removed to accomplish this work.

The septic tank/sand filter system at the campground would continue to be operated and maintained as it is now. This includes system inspections, filter maintenance, and periodically pumping out the tanks and disposing of the waste at a local municipal wastewater treatment plant.

At the picnic area, Alternative 2 includes installation of two new conventional septic systems, one for each comfort station. The existing septic system would be disconnected and left in place. A septic tank, conventional drain field with infiltration chambers, and associated sewer lines would be installed at each of the two comfort stations. The location and size of the new septic systems (Figure 2) are based on site-specific soil surveys conducted by a licensed soil scientist. Both systems would be in areas that are forested. The total area of disturbance and tree clearing for the two systems would be approximately 0.5 acres. The drain field areas would be seeded with a Park-approved mix following construction and maintained to prevent regrowth of trees because tree root growth can interfere with drain field function. Long-term maintenance of the septic systems would include periodically pumping out the tanks and disposing of the waste at a local municipal wastewater treatment plant.

Four reserve drain fields, two for the picnic area and two for the campground, totaling approximately 1 acre have also been identified as part of Alternative 2 (Figure 2). All or part of the reserve drain fields in the picnic area could be used in the future if soils in the primary drain fields can no longer function properly. The reserve drain fields in the campground could be used in the future if the Park identifies the need to replace the sand filter system in the campground. With good design, installation, operation, and maintenance, drain fields are expected to have a useful life span of at least 10-30 years and some systems could have more than 50-year life expectancy. Specifics regarding whether the reserve areas would need

to be used in the future and the exact size of the area that might need to be used are unknown at this time. For analysis purposes, it is assumed that the reserve areas would not be used for at least 10 years. Any future use of the reserve areas would be subject to further analysis in accordance with NPS policies and NEPA.

SUMMARY OF GROUND DISTURBANCE AND TREE CLEARING

In summary, the total area of disturbance for Alternative 2 would be about 1.9 acres and approximately 1.1 acres of tree clearing would be necessary. Approximately 0.6 acres of existing forest would be permanently converted to a gravel water tank access road and about 0.5 acres would be converted to open, maintained vegetation. Approximately 0.8 acres of existing maintained grass would be temporarily disturbed and restored following construction. These figures do not include possible future use of the reserve drain fields, which could result in up to approximately 1 acre of additional ground disturbance and tree clearing.

MITIGATION MEASURES

NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. The following mitigation measures would be implemented under Alternative 2 to avoid and minimize impacts. The analysis in Chapter 3 takes mitigation measures into account.

- Implement the following measures to avoid and minimize potential impacts on Carolina northern flying squirrels:
 - Conduct tree and vegetation clearing between September 1 and March 14 (i.e., outside the maternity season) to avoid impacts on Carolina northern flying squirrel pups. This measure would also avoid impacts on nesting birds.
 - All trees proposed for cutting would be inspected by a Park wildlife biologist to determine species and suitability for Carolina northern flying squirrels (e.g., drey nests and/or denning potential) prior to cutting.
 - Trees with identified drey nests or possible cavity dens would be inspected prior to removal by a Park wildlife biologist visually with a thermal imaging scope early in the morning to detect heat signatures that may indicate a potentially occupied drey nest or cavity. Potential drey nests would be visually inspected with binoculars, and accessible cavities would be inspected with a peeper scope for evidence of Carolina northern flying squirrel use.
 - If feasible, trees with active dens or dreys would be retained or resurveyed. If resurvey indicates the tree is not occupied, it would be cut immediately following the survey.
 - If removal of a tree with an active den is unavoidable, actions would be taken to encourage the squirrel to vacate the tree and the immediate area prior to cutting the tree. These actions may include wood knocking the tree trunk, rustling branches, or other measures to stimulate a predator avoidance response.
 - Allow for ecological succession of the vegetation along the old 0.7-mile water tank access road.
- Implement sediment and erosion control measures consistent with the requirements and recommendations contained in the *North Carolina Erosion and Sediment Control Planning and Design Manual* (NCDEQ 2013). File Notice of Intent with North Carolina Department of Environmental Quality to obtain coverage under the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction

Activities. Develop site-specific stormwater pollution prevention plan in accordance with Part II of the General Permit. The following requirements will be included with the stormwater pollution prevention plan:

- Return disturbed areas to original grade or final grade as soon as practical and reseed with a Park-approved seed mix.
- Specification of erosion control materials that are weed-free, pest-free, and do not have a risk of entangling wildlife. Specific materials prohibited in the Park include, but may not be limited to, the following: a) imported hay bales, straw bales, wood chips, or mulch. (Note that wood excelsior products and straw filter logs and blankets that are certified as fumigated and weed-free may be used). b) All forms of plastic/synthetic mesh netting, including those that are label as biodegradable or photodegradable.
- Temporarily stop work and immediately notify the Superintendent and Park Archeologist if cultural resources or archeological materials are inadvertently encountered during the project. Do not proceed with work until authorized by the Superintendent, in consultation with the Park Cultural Resources Program Manager or the Park Archeologist. Apply the discovery process defined by 36 CFR 800.13, the implementing regulations for the National Historic Preservation Act (16 United States Code [USC] 470. Evaluation of the discovery's significance would include consultation as appropriate with the state historic preservation office, the Advisory Council on Historic Preservation, and all Tribes associated with the Park. If human remains, funerary objects, sacred objects, or objects of cultural patrimony were discovered, the process defined by 43 CFR 10.4-5, the implementing regulations of the Native American Graves Protection and Repatriation Act (25 USC 3001), would be applied.
- Require the contractor to remove food trash daily or use a bear-proof dumpster.
- Implement the following measures to avoid introduction of new invasive plant species to the project area and minimize the spread of existing invasive plants:
 - Clean all earthmoving and seeding equipment prior to entering the Park.
 - Use only topsoil, rock, sand, gravel, seed mixes, or other natural materials from Park-approved sources.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

The following alternatives were considered but dismissed from further analysis because they were not considered reasonable alternatives (e.g., they did not meet purpose and need or were determined not to be technically or economically feasible):

- **Rehabilitation of old water tank access road**—At one time the water tank was accessed by a 0.7-mile dirt road that starts at the existing pump house. This old road has not been used in approximately 10 years, is overgrown and is currently unusable. Restoration of the old road is not feasible or desirable because of apparent shifting of a small stream and earth slides above the road. Rehabilitating the old road would have greater impact than construction of a new, shorter (about 0.25 miles) water tank access road. Therefore, this alternative was dismissed from further analysis.
- **Installation of other types of septic systems in Balsam Mountain Campground**— Results of the soil survey indicated that soils in the campground are suitable for the existing sand filter system, low-pressure drain field systems, and drip dispersal systems, but are not suitable for conventional septic drain fields. Therefore, conventional septic systems were dismissed from

consideration for the campground. Low pressure and drip dispersal systems require electrical power and typically have higher operations and maintenance requirements compared to the existing sand filter system. Electrical power is not available in the campground and the existing sand filter system, with replacement of the sewer lines, meets the wastewater treatment needs for the campground. Therefore, low pressure and drip dispersal systems were dismissed from further consideration.

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CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment and analyzes the potential environmental impacts of each alternative for the resources described below. The affected environment describes existing conditions for those elements of the human environment that would be affected by the implementation of the alternatives considered in this EA. Impacts on each of these topics are then analyzed in the “Environmental Consequences” section for each alternative.

ISSUES AND IMPACT TOPICS

In accordance with NEPA and the NPS *NEPA Handbook* (2015), the discussions and analysis in this EA focus on pivotal issues. Issues and impact topics that are not meaningful to the decision were not carried forward for detailed analysis. The Park interdisciplinary team identified the following impact topics and issues for detailed analysis in the EA:

- **Vegetation, forest communities:** Construction of the new water tank access road and installation of the new septic systems in the picnic area would require tree clearing and would result in permanent conversion of forested areas to gravel road surface or open vegetation communities.
- **Special status species, Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*):** Tree clearing would occur in areas that are potentially suitable habitat for the Carolina northern flying squirrel. Tree clearing may affect individual squirrels if this habitat is occupied.

Impact topics and issues that the NPS interdisciplinary team considered but dismissed include resources for which the proposed action would have no potentially significant impacts. Topics and issues dismissed from detailed analysis in the EA include the following:

- **Environmental Justice:** All federal agencies are required to incorporate environmental justice into their policies by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs on minorities and low-income populations and communities. The alternatives under consideration in this EA will have no appreciable impact on minorities or low-income populations or communities. The proposed action will not result in identifiable adverse human health effects, nor will they substantially alter the physical and social structure of the nearby communities. This EA does not further analyze this topic because the proposed action would have no adverse effect on minority or low-income populations.
- **Cultural resources:** No historic properties that are listed or eligible for listing on the National Register of Historic Places have been identified in the area of potential effect. Balsam Mountain Campground and Heintooga Picnic Area are recommended not eligible for listing on the National Register based on the Park’s Historic Resource Study (NPS 2016). No archeological resources that are potentially eligible for listing were identified during a phase 1 archeological survey conducted by the Park Archeologist. In accordance with Section 106 of the National Historic Preservation Act, NPS has initiated consultation with the North Carolina State Historic Preservation Office (SHPO) as well as Native American Tribes and Nations (Cherokee Nation, Eastern Band of Cherokee, Eastern Shawnee Tribe of Oklahoma, United Keetoowah Band of Cherokee, Muscogee Nation, and the Poarch Band of Creek Indians). NPS has requested concurrence that the undertaking would not affect historic properties. The Section 106 consultation process will be completed prior to NPS issuing a decision document for the undertaking and outcomes of the consultation process will be summarized in the decision document. This EA does not further analyze this topic because the proposed action would have no adverse effect on cultural resources.

- **Vegetation, nonnative invasive plants:** The project includes mitigation measures to avoid and minimize the introduction and spread of non-native invasive plants. This EA does not further analyze this topic because the proposed mitigation measures would effectively avoid and minimize impacts associated with invasive plants.
- **Wetlands:** No wetlands occur in or adjacent to the project area based on review of the Park's wetlands data and a reconnaissance survey conducted by Resource Management and Science Division staff. This EA does not further analyze this topic because the proposed action would have no adverse effect on wetlands.
- **Terrestrial wildlife:** Construction of the new water tank access road and installation of the new septic systems in the picnic area would require tree clearing and would result in permanent conversion of forested wildlife to gravel road surface (0.6 acres) or open vegetation communities (0.5 acres). These permanent changes in vegetation represent permanent changes in wildlife habitat. Habitat for some species would be adversely affected, while habitat for species that use open vegetation communities would be created. Overall, the changes in wildlife habitat are considered adverse, minor impacts because they signify a departure from existing natural conditions but only affect a small area (approximately 1.1 acres). Habitat changes are not expected to result in population-level impacts or changes in the types of species using the campground and picnic areas. As noted in the mitigation measures section, tree clearing would be done between September 1 and March 14 to avoid impacts to nesting birds. Therefore, this impact topic was not carried forward for further analysis in the EA.
- **Soils and surface water:** The proposed action would include a total of about 1.9 acres of ground disturbance, most of which would be temporary disturbance during construction. About 0.6 acres would be permanently converted from forest to a gravel road surface. As outlined in the mitigation measures section above, an NPDES permit would be required for the construction phase of the project and the new water tank access road would be designed for proper stormwater drainage. Implementation of erosion and sediment control measures in accordance with the permit would avoid and minimize impacts to soils and surface water during construction. Therefore, these impact topics were not carried forward for further analysis in the EA.
- **Recreation resources and visitor use and experience:** As noted in the description of the proposed action, construction would be scheduled during the campground and picnic area closed season (mid-October to mid-May) to the extent possible to minimize impacts to visitors. Visitors would be notified in advance if temporary closures become necessary to conduct construction work during the open season. Overall, the proposed action would benefit recreational resources and visitors by providing more reliable infrastructure and reducing unplanned area closures for infrastructure repairs. Any adverse impacts on recreational resources and visitor use and experience would be temporary and minor. Therefore, these impact topics were not carried forward for further analysis in the EA.
- **Wilderness:** No work is proposed in areas that are managed as wilderness. Areas managed as wilderness adjacent to campground and picnic area could experience temporary noise and visual intrusions during construction, but there would be no long-term changes in wilderness character. Therefore, this impact topic was not carried forward for further analysis in the EA.

VEGETATION

AFFECTED ENVIRONMENT

The project area includes four vegetation categories, based on the most recent vegetation inventory for the Park (Hop et al. 2021) (Figure 3). These mapping categories are broad, and each category may have multiple vegetation community types within it. Below is a brief description of each category as it applies to the Balsam Mountain Area, in descending order of acreage in the project area.

High-Elevation Deciduous Forest and Woodlands

This vegetation classification is dominated by deciduous northern hardwood species in the canopy, with occasional coniferous trees present in small numbers. Yellow Birch (*Betula alleghaniensis*), American Beech (*Fagus grandifolia*), Yellow Buckeye (*Aesculus flava*), and Sugar Maple (*Acer saccharum*) tend to dominate, though a mix of other species may be present at times, such as Silverbell (*Halesia tetraptera*), Black Cherry (*Prunus serotina*), Northern Red Oak (*Quercus rubra*), Eastern Hemlock (*Tsuga canadensis*), and Red Spruce (*Picea abies*). The understory in these forests vary from sparse with occasional sedge and grass species present, to moderately rich with plants such as Spring Beauty (*Claytonia virginiana*) and Trout Lily (*Erythronium umbilicatum*) present in higher numbers. Within the project boundary, this forest type is found throughout much of the Balsam Mountain Campground, the western section of the Heintooga Picnic Area, and much of the area near the water tank site. All disturbance related to the water tank rehabilitation, road, and the primary drain fields for the picnic area occur in this forest type.

Cultural Vegetation (Maintained Landscapes)

The Cultural Vegetation category consists of any areas that are altered and maintained by current management practices that keep them from reverting to a natural state for safety, ease of access, or other operational requirements. Within the project area, cultural vegetation includes roadways and road rights-of-way that are mowed regularly, parking areas, camping spots, and the current mowed drain field for Balsam Mountain. Much of the picnic area and parts of the campground are not mapped as Cultural Vegetation as they have intact canopies and relatively intact understories and are not mowed or cleared regularly. New drain fields and roadways would be converted to Cultural Vegetation as part of this project and maintained in a non-forested, open state.

High Elevation Mixed Deciduous-Conifer Forest

This vegetation classification is similar to the High-Elevation Deciduous Forest and Woodlands above, except that it has a higher occurrence of Red Spruce in the canopy. These mixed stands are usually dominated by Red Spruce and Yellow Birch, with occasional other high elevation species present in lower numbers. The understory vegetation varies based on aspect and soil type but is often sparse with moderate coverage of deciduous shrubs. Areas that are lower slope with good moisture availability can be rich, with common species in the area being various grasses and sedges, Bluebead lily (*Clintonia borealis*), Fly-poison (*Amianthemum muscaetoxicum*), various asters (*Symphyotrichum*), and goldenrods (*Solidago*). Within the project area, this forest type occurs along the road in between the campground and picnic area, in the northeastern portion of the picnic area, and in the eastern portion of the water tank area. The only large disturbance to this forest type in the proposed alternatives would come as part of reserve drain field use at a future time, which would be subject to another NEPA review.

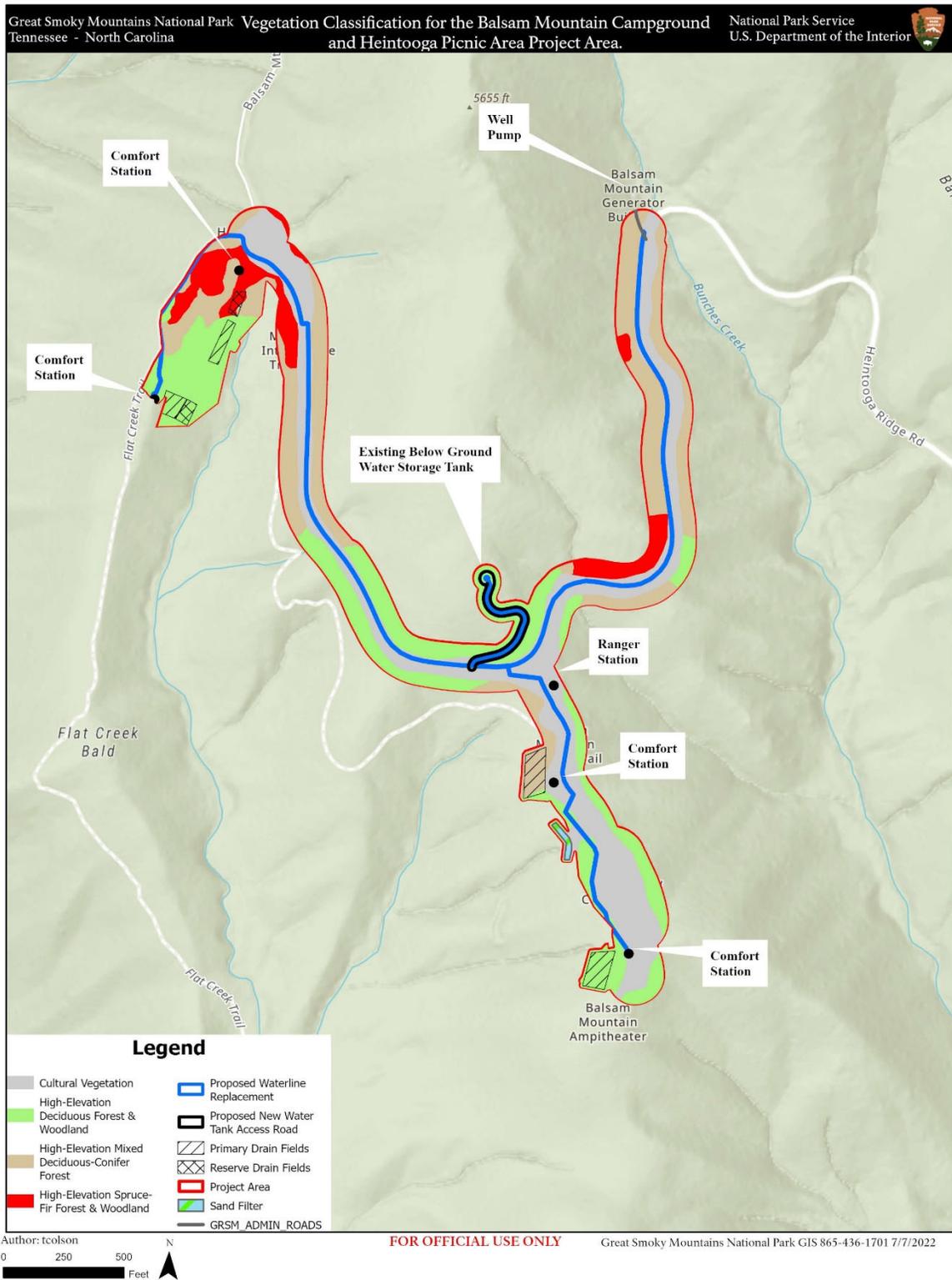


Figure 3: Vegetation Classification for the Balsam Mountain Campground and Heintooga Picnic Area Project Area.

High-Elevation Spruce-Fir Forest and Woodland

This forest type differs from the others in being conifer-dominated, with Red Spruce being the dominant species. Fraser fir (*Abies fraseri*) has very low coverage within the project area but can be found in low numbers. A small number of deciduous species can also be present, chiefly Yellow Birch. The understory in these zones resemble the mixed conifer/deciduous stands and are most often sparse with moderate cover of deciduous shrubs. Areas with higher moisture and good soil can have higher herbaceous diversity though, with species present being similar to the mixed stands listed above. In the project area, Spruce-Fir forests can be found along the northern edge of the water tank area and scattered throughout the Heintooga Picnic Area. The only large disturbance to this forest type in the proposed alternatives would come as part of reserve drain field use at a future time, which would be subject to another NEPA review.

Reasonably Foreseeable Environmental Trends and Planned Actions

High elevation deciduous, mixed, and spruce/fir forests are found throughout the Park and southern Appalachians at elevations above 4,000 feet and serve as important habitat for many plant and animal species, including species disjunct from cooler northern populations, southern Appalachian endemic species, and species affected by human-transported pests (such as hemlock woolly adelgid, balsam woolly adelgid, and beech bark disease). A combination of climate changes, acid deposition, and forest pests have had an impact across the high elevations of the Park, leading to degradation of these habitats through the decline of key tree species such as American beech and Fraser fir. Pre-park logging and associated fires impacted much of the upper elevation forests as well, though most have recovered into full canopy forests at present. Overall, the Park has some of the most intact high elevation forests in the southern Appalachians.

Most of the Park's high-elevation forests are within areas that are managed as wilderness, except for developed areas and transportation and utility corridors. As a result, construction/maintenance activities in high-elevation forests have been minimal for many years. Past, present, and other future planned actions in high-elevation forests include hazard tree removal and routine vegetation maintenance in developed areas, including roads, utility corridors, scenic vistas, and backcountry campsites; as well as forest management practices to monitor and control forest pests and invasive plants. Overall, these activities have a minimal adverse impact on high-elevation forests. The only other planned action in the project area over the next few years is road repaving, which would not involve tree removal or other impacts to high-elevation forests.

ENVIRONMENTAL CONSEQUENCES

Alternative 1—No Action

Under the no action alternative, there would be no tree clearing and no change to existing vegetation. Therefore, no new impacts on vegetation are anticipated. Other planned actions in the project area, including road repaving and continuation of forest management practices, would not result in tree removal or other adverse impacts to forest communities. Therefore, cumulative impacts to vegetation are not anticipated under Alternative 1.

Alternative 2—Proposed Action and NPS Preferred Alternative

Under Alternative 2, tree clearing would be required for construction of the new water tank access road, rehabilitation of the water tank, and installation of two septic systems in the picnic area. The total area cleared would be about 1.1 acres (Table 1), with about 0.6 acres being permanently converted to a gravel road and about 0.5 acres converted to open, maintained vegetation. Approximately 0.8 acres of existing Cultural Vegetation would be temporary disturbed and restored following construction.

Table 1: Estimated Changes in Vegetation

Vegetation Classification	Acreage⁽¹⁾ Alternative 1 (No Action)	Acreage⁽¹⁾ Alternative 2 (Proposed Action)	Change
High-Elevation Deciduous Forest and Woodlands	17.6	16.5	-1.1
Cultural Vegetation/Maintained Landscape	15.4	16.5	1.1
High-Elevation Mixed Deciduous-Conifer Forest	15.3	15.3	0
High-Elevation Spruce-Fir Forest and Woodland	4.3	4.3	0

⁽¹⁾Acreage does not include reserve drain fields totaling an additional 1 acre, which have also been identified as part of Alternative 2. For analysis purposes, it is assumed that the reserve areas would not be used for at least 10 years. Any future use of the reserve areas would be subject to further analysis in accordance with NPS policies and the National Environmental Policy Act.

An additional 1 acre of forest could be converted at a future time if reserve drain fields are needed. These forests were historically disturbed, but currently exist in a high-quality natural state with relatively diverse herbaceous flora growing within them. Conversion of 1.1 acres from forest represents about a 2% loss of natural vegetation in the proposed project area, though all mentioned forest types are common in higher elevations of the Park and extend contiguously outside of the project area. High elevation forests are important refugia for many plant and animal species within the Park and southern Appalachians in general and are expected to increase in importance due to climate-driven changes in forest communities. If reserve drain fields are needed in the future, it is expected that primary drain fields would be abandoned and allowed to revert to forested conditions, which could take as much as a century to occur. However, this conversion back to natural conditions would mostly offset future acreage losses due to use of the reserve fields.

As discussed in the Reasonably Foreseeable Environmental Trends and Planned Actions section above, high-elevations forests in the Park have recovered to some extent from pre-park logging, fires, and forest pests, but continued recovery could be affected by a changing climate. Past, present, and other future planned actions in high-elevation forests within the Park (e.g., hazard tree removal, routine vegetation maintenance, and management practices to monitor and control forest pests and invasive plants) would not change the extent or distribution of high-elevation forest coverage and would have minimal adverse impacts on high-elevation forests.

Alternative 2 would result in clearing of approximately 1.1 acres of high-elevation forest. When the incremental impacts from Alternative 2 are combined with the impacts from past, present, and reasonably foreseeable actions, the overall cumulative impact on vegetation would be adverse. Although uncertainty exists, climate change is expected to influence the future health of high-elevation forests. The proposed tree clearing under Alternative 2 is not expected to have measurable effect on future trends in overall forest health based on the relatively small area affected.

SPECIAL STATUS SPECIES, CAROLINA NORTHERN FLYING SQUIRREL

AFFECTED ENVIRONMENT

Carolina northern flying squirrel is a federally endangered subspecies of northern flying squirrel that occurs in disjunct sky islands of montane conifer–northern hardwood forests in the southern Appalachian Mountains. The project area is in the Great Smoky Mountains Geographic Recovery Area identified in the recovery plan (USFWS 1990) and contains suitable habitat for this subspecies. Critical habitat has not been designated for this subspecies.

Potential occupied habitat for Carolina northern flying squirrel is generally described as 1) all stands containing spruce or fir, or 2) all stands above 4,500 feet containing hemlock or northern hardwoods in any combination, and partially closed-canopy stands with trees greater than 10 inches in diameter at breast height (USFWS 1990). Figure 4 depicts potential northern flying squirrel habitat (elevations greater than 4,500 feet) and capture sites within the Park. Ford et al. (2015) used nest box presence-absence capture data from North Carolina Wildlife Resources Commission to develop a predictive habitat model for Carolina northern flying squirrel. Since this model was based solely on the squirrel’s denning habitat, it should be considered a first approximation (Ford et al. 2015). The model indicated that relative occupancy levels were associated with habitat types as follows: high probability in spruce-fir and spruce-fir/northern hardwood (yellow birch type) forests, medium probability in northern hardwood forests, and low probability in high elevation red oak with red spruce. Approximately, 63% (48,699 acres) of the high-quality habitat identified by the model exists within the Great Smoky Mountains Geographic Recovery Area (USFWS 2022).

Carolina northern flying squirrels are nocturnal. During cooler months these squirrels commonly occupy tree cavities and during summer they construct outside leaf nests or drey nests (USFWS 1990). Yellow birch (*Betula alleghaniensis*) is an important habitat component for denning and as a source of nest material, but spruce-fir appears to be more important than initially believed for denning (USFWS 2022). Diggins et al. (2017) tracked 21 squirrels to den sites during work in spruce-fir and spruce-northern hardwood forests and found that nearly 67% of cavities used for denning were in conifers (live and dead) and approximately 95 percent of drey nests were in large, live conifers. Use of subterranean dens and dens in or under logs have also been documented (USFWS 2022). Flying squirrels use multiple den/nest trees (USFWS 1990) and Diggins et al. (2017) reported an average minimum convex polygon home range of 11.1 acres. The Carolina northern flying squirrel maternity season is March 15 – August 30.

Information on the abundance and distribution of Carolina northern flying squirrel in the Park is limited. The first record was from the Blanket Mountain area in 1935 (Handley 1953). In 1959, a nursing female was found dead on Highway 441 near Walker Prong (Linzey 1995). Weigl (1990) captured seven individuals but concluded that the species was largely confined to the Clingmans Dome/Indian Gap area. Other small mammal studies have resulted in a few captures in the same area (Powell 1990, Loeb 1999, Pivorun personal communication.). Nest box surveys conducted by the North Carolina Wildlife Resources Commission revealed a much wider distribution of Carolina northern flying squirrel, including a capture approximately 300 feet north of the Heintooga picnic area in 2005 (unpublished data).

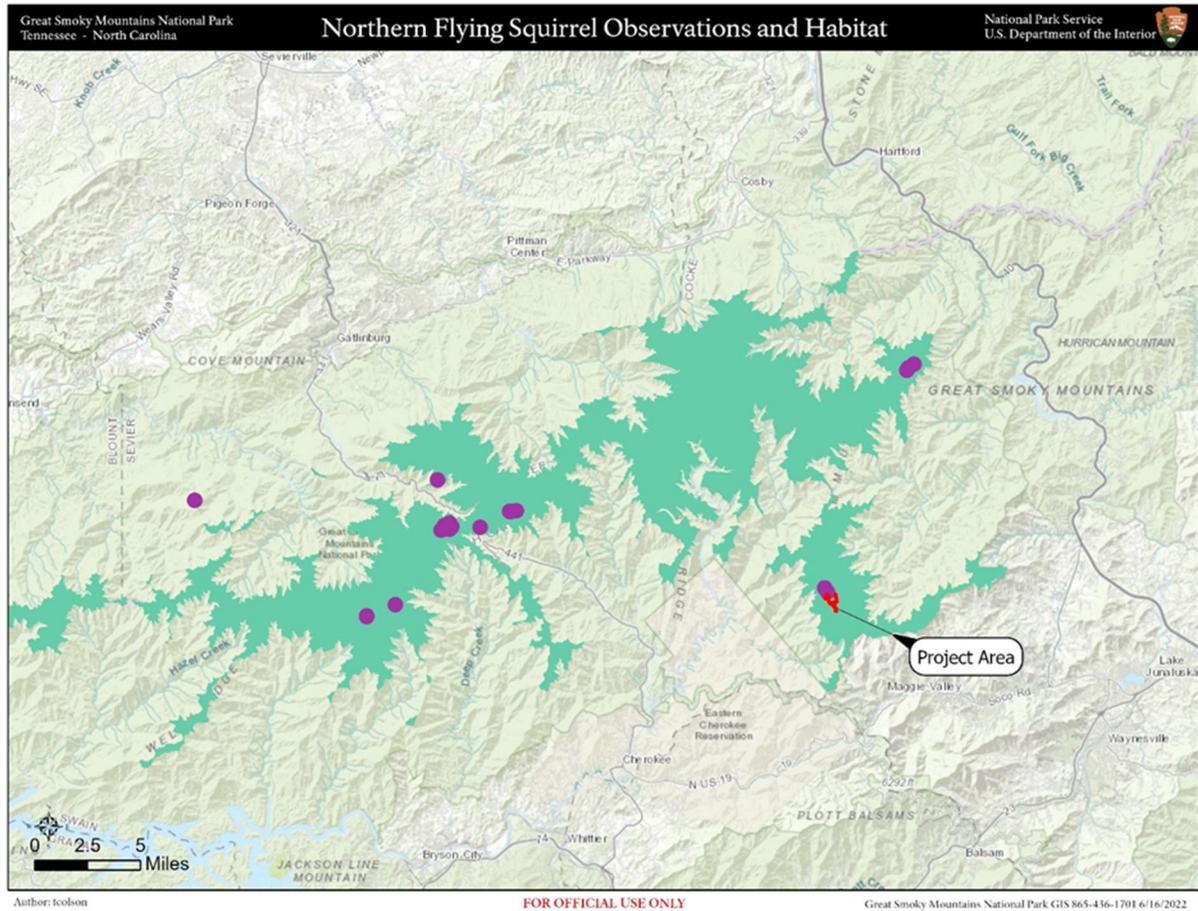


Figure 4: Potential Northern Flying Squirrel Habitat and Capture Sites in Great Smoky Mountains National Park.

Reasonably Foreseeable Environmental Trends and Planned Actions

Although preliminary analysis of data for seven Geographic Recovery Areas in North Carolina suggests that at least some Carolina northern flying squirrel populations are stable, the most recent 5-year review completed by the U.S. Fish and Wildlife Service indicates that a reliable assessment of population status in any of the Geographic Recovery Areas is not available (USFWS 2022).

Historic logging practices and associated fires in the late 1800s/early 1900s greatly reduced the range of spruce-fir forest, which is important Carolina northern flying squirrel habitat, in the Southern Appalachians. The loss and fragmentation of these habitats from timber harvest, introduced pest species such as the balsam wooly adelgid (*Adelges piceae*), pollution, road construction, and other development are thought to be the primary reasons for the squirrels' decline. The most recent 5-year review notes that while there is evidence of recovery of spruce-fir forests from acid pollution and balsam wooly adelgid in some areas, improvements may be short-lived in a changing climate (USFWS 2022).

As noted in the Vegetation section above, most of the Park's high-elevation forests and Carolina northern flying squirrel potential habitat are within areas that are managed as wilderness and construction/maintenance impacts at these elevations have been minimal for many years. Past, present, and other future planned actions would have a minimal adverse impact on these forests and squirrel habitat.

ENVIRONMENTAL CONSEQUENCES

Alternative 1—No Action

Under the no action alternative, there would be no tree clearing and no change to existing vegetation. Therefore, no new impacts on Carolina northern flying squirrel are anticipated. Other planned actions in the project area, including road repaving and continuation of forest management practices, would not result in tree removal or other adverse impacts to Carolina northern flying squirrels and their habitat. Therefore, cumulative impacts to Carolina northern flying squirrels are not anticipated under Alternative 1.

Alternative 2

Within the 36 acres of potential squirrel habitat (High-Elevation Deciduous Forest, High-Elevation Mixed Deciduous-Conifer Forest, and High-Elevation Spruce-Fir Forest listed in Table 1), approximately 1.1 acre of tree clearing would be required for the proposed water and wastewater improvements in the campground and picnic area. Potential stressors associated with actions that may affect Carolina northern flying squirrels include tree removal and noise.

Removal of trees with active dens or dreys may affect individual squirrels, including non-mobile pups if they are present. As noted in the Mitigation Measures section of Chapter 2, tree removal under Alternative 2 would occur between September 1 and March 14, which is outside the maternity season when non-mobile pups could be present. Therefore, tree removal is not expected to result in injury or mortality of pups. The Mitigation Measures section also includes pre-construction surveys to determine if any trees planned for removal are occupied by squirrels. If feasible, trees with active dens or dreys would be retained. If removal of a tree with an active den is unavoidable, actions outline in the Mitigation Measures section (e.g., wood knocking the tree trunk, rustling branches, or other measures to stimulate a predator avoidance response) would be taken to encourage the squirrel to vacate the tree and the immediate area prior to cutting the tree. Given these measures, it is unlikely that squirrels would be present when the tree is felled and squirrel injury or mortality from tree removal is not expected. As noted above in the Affected Environment section, Carolina northern flying squirrels use multiple dens and trees, and their home range is about 11 acres. Given the relatively small area affected by tree removal (approximately 1.1 acres) and the proposed mitigation measures, if present, individual squirrels would be expected to flee the immediate area and use alternative dens or dreys outside the area of tree clearing. Direct effects of tree removal on individual squirrels could include short-term behavioral and physiological effects, but effects to the overall fitness of individuals would be insignificant.

Tree clearing under Alternative 2 would permanently convert approximately 1.1 acres of suitable Carolina northern flying squirrel habitat to a maintained cultural landscape, which represents about a 2% loss of suitable habitat in the proposed project area and a 0.002% loss of modelled high-quality habitat in the Great Smoky Mountains Geographic Recovery Area. Given the relatively small area effected (about 1.1 acres) and the non-contiguous distribution across the project area, tree removal is not expected to result in canopy gaps that would noticeably alter squirrel movements. The effects of tree clearing under Alternative 2 on Carolina northern flying squirrel habitat would be insignificant based on the relatively small area affected.

Noise

Squirrels would be intermittently exposed to noise and visual cues during construction. These potential stressors are discussed together because distinguishing between an animal's responses to noise and visual cues is often difficult. Significant changes in noise levels or visual disturbance in an area can temporarily or permanently alter an animal's behaviors or cause them to avoid areas. The intensity of these impacts depends on the novelty of the disturbance in an area, proximity of the disturbance to an animal's home range, and the frequency and duration of disturbances.

Under the proposed action, noise levels would be altered from existing conditions during project construction. If habitat in the immediate vicinity of construction work is occupied, temporary noises associated with heavy equipment and chainsaw operation could startle squirrels. Although responses are difficult to predict, it is expected that individual flying squirrels would exhibit brief behavioral and physiological reactions such as a startle response when exposed to loud construction noise. It is also possible that flying squirrels could flee a nest or den in response to the noise. Carolina northern flying squirrels typically use multiple dens in various trees and have a home range of about 11 acres; therefore, individuals responding to the construction noise may move to another den and would likely return to normal behavior shortly after. The possibility of a female fleeing a natal den or nest is not a concern because the proposed construction work would take place outside the maternity season. Given that flying squirrels have been captured in nest boxes along Balsam Mountain Road and within 300 feet of the picnic area suggest they are somewhat tolerant of noise and human disturbances in the area.

Under Alternative 2, noise levels would be altered from existing conditions during project construction. If habitat in the immediate vicinity of construction work is occupied, temporary noises associated with heavy equipment and chainsaw operation could startle squirrels. Although responses are difficult to predict, it is expected that individual flying squirrels would exhibit brief behavioral and physiological reactions such as a startle response when exposed to loud construction noise. It is also possible that flying squirrels could flee a nest or den in response to the noise. Carolina northern flying squirrels typically use multiple dens in various trees and have a home range of about 11 acres; therefore, individuals responding to the construction noise may move to another den and would likely return to normal behavior shortly after. The possibility of a female fleeing a natal den or nest is not a concern because the proposed construction work would take place outside the maternity season. Given that flying squirrels have been captured in nest boxes along Balsam Mountain Road and within 300 feet of the picnic area suggest they are somewhat tolerant of noise and human disturbances in the area.

In summary, disturbances associated with construction would be short-term and temporary. If flying squirrels are present in the immediate vicinity of the project area they may respond to noise and human activity during construction, but the proposed activities are not expected to adversely affect the fitness of individual squirrels. The proposed action would not result in long-term changes in noise or visual disturbances once construction is complete. The effects of noise and human disturbance would be insignificant. In accordance with section 7 of the Endangered Species Act, NPS initiated informal consultation with U.S. Fish and Wildlife Service and has requested concurrence from the Service that Alternative 2 may affect but is not likely to adversely affect Carolina northern flying squirrels. The Park will complete the section 7 consultation process prior to finalizing the NPS decision document for this EA.

As discussed in the Reasonably Foreseeable Environmental Trends and Planned Actions section above, flying squirrel habitat in the Park has recovered to some extent from pre-park logging, fires, and forest pests, but continued recovery could be affected by a changing climate. Past, present, and other future planned actions in flying squirrel habitat within the Park (e.g., hazard tree removal, routine vegetation maintenance, and management practices to monitor and control forest pests and invasive plants) would not change the extent or distribution of high-elevation forest habitat and would have minimal adverse impacts on Carolina northern flying squirrels.

Alternative 2 would result in clearing of approximately 1.1 acres of high-elevation forest and flying squirrel habitat. When the incremental impacts from Alternative 2 are combined with the impacts from past, present, and reasonably foreseeable actions, the overall cumulative impact on Carolina northern flying squirrels would be adverse. Although uncertainty exists, climate change is expected to influence the future health of high-elevation forests and flying squirrel habitat. The proposed tree clearing under Alternative 2 is not expected to have measurable effect on future trends in overall forest health or habitat quality based on the relatively small area affected.

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CHAPTER 4: CONSULTATION AND COORDINATION

PUBLIC COMMENT

A 15-day public comment period will be held for the EA. The Park will notify stakeholders by email and the public by news release. The EA will be available for public review and comment on the NPS Planning, Environment, and Public Comment (PEPC) website <http://parkplanning.nps.gov>.

AGENCY AND TRIBAL CONSULTATION

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

In accordance with section 7 of the Endangered Species Act, NPS initiated informal consultation with U.S. Fish and Wildlife Service and has requested concurrence from the Service that the preferred alternative may affect but is not likely to adversely affect Carolina northern flying squirrels. The Park will complete the section 7 consultation process prior to finalizing the NPS decision document for this EA.

NATIONAL HISTORIC PRESERVATION ACT SECTION 106 AND TRIBAL CONSULTATION

No historic properties that are listed or eligible for listing on the National Register of Historic Places have been identified in the area of potential effect. In accordance with section 106 of the National Historic Preservation Act, NPS has initiated consultation with the North Carolina State Historic Preservation Office (SHPO) and traditionally associated Native American Tribes and has requested concurrence that the undertaking would not affect historic properties. A final determination of effect is pending completion of the section 106 process, including consideration of any public comments on this EA and ongoing consultation with North Carolina SHPO and traditionally associated Native American Tribes. The Park will complete the section 106 consultation process prior to finalizing the NPS decision document for this EA. Furthermore, if additional information on ethnographic resources or traditional uses is provided by the Tribes, the Park will work with concerned parties to resolve any potential impacts associated with the proposed action.

CHAPTER 5: LIST OF PREPARERS

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CHAPTER 6: ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	environmental assessment
NEPA	National Environmental Policy Act
NCDEQ	North Carolina Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
Park	Great Smoky Mountains National Park
PEPC	Planning, Environment, and Public Comment
SHPO	State Historic Preservation Office
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

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CHAPTER 7: REFERENCES

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

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