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Elkmont Historic District
Draft Environmental Impact Statement and General Management Plan Amendment

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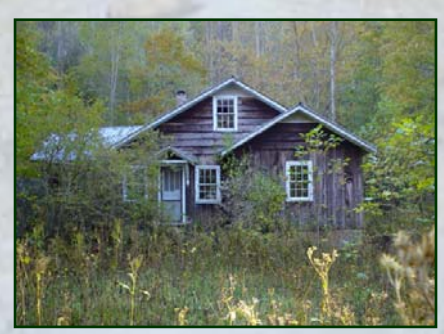

ELKMONT HISTORIC DISTRICT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
and
GENERAL MANAGEMENT PLAN AMENDMENT

SUMMARY

INTRODUCTION

Elkmont Historic District (District) is located within the Tennessee portion of Great Smoky Mountains National Park (Park), approximately six miles from Park Headquarters and eight miles from Gatlinburg, Tennessee.

The first recorded European- American settlement in the Elkmont area occurred in the 1830s along Jakes Creek, a tributary to the Little River, and consisted primarily of subsistence based agricultural economy. By the 1880s the first, small- scale logging operations were underway in the vicinity, but because the area was so remote, and timbering operations relatively primitive, commercial opportunities were limited. Large- scale, industrial logging began in the area in the early 1900s when the Little River Lumber Company was established in Townsend, Tennessee. By 1908, The Little River Railroad Company had constructed a rail line along the Little River from Townsend to the current site of Elkmont. The community of Elkmont soon developed between 1908 and 1925 in the typical "boom" fashion of many towns and communities associated with resource extractive activities common during that era.

In 1910 and 1912, two private resort communities were established on the outskirts of Elkmont known as the Appalachian Club and the Wonderland Club, respectively. Between 1910 and 1940, a social clubhouse, a hotel and annex and several dozen individual vacation cabins were constructed as part of these two, separate social clubs. In 1926, legislation for the creation of a National Park in the Smoky Mountains was passed in Congress and in 1934, the Park was officially established. Unlike western parks that were created from existing federal lands, Great Smoky Mountains National Park was created from lands purchased by the States of North Carolina and Tennessee from individual land owners and deeded as a grant to the federal government for the purpose of establishing this Park. Rather than face condemnation through the state held power of eminent domain, most property owners in the two clubs chose an option offered in 1932 that permitted a partial payment for property in exchange for a lifetime lease. Between 1934 and 1942, the formal community of Elkmont was removed and by the late 1960s, the National Park Service had developed the present day campground on the same site. In 1952, lifetime leases held by members of the two clubs were surrendered for a fixed 20 year lease in exchange for commercial power service. In 1972, the Secretary of the Interior permitted Elkmont leases to be extended for another 20 years. In the early 1990s, attempts at extending leases were unsuccessful and in 1992, all but three leases on buildings expired with the last three expiring in 1996 and 2001. The vacated buildings have remained empty since leases expired pending a final decision on the future management of Elkmont.

PURPOSE AND NEED FOR ACTION

The purpose of this environmental planning initiative is to reevaluate the current management strategy for the Elkmont Historic District as articulated in the 1982 Great Smoky Mountains National Park General Management Plan.

Based upon direction in the 1982 General Management Plan (1982 Plan), the Park planned to remove all buildings under lease to the Elkmont Preservation Committee when leases expired, allowing the area to be returned to a natural state. The only other action proposed in the 1982 Plan in addition to removal of the buildings is construction of a picnic shelter. The 1982 Plan states:

Leases for approximately 50 structures occupied by the Elkmont Preservation Committee (cabins and the Wonderland Hotel) will expire in 1992, and four remaining leases will expire in 2001. None of these leases will be extended and the structures are proposed for removal on termination of the leases. Building sites will be returned to a natural state.

In 1994, the Elkmont community was listed on the National Register of Historic Places (National Register) as an historic district, with 49 of the 74 buildings that remain listed as contributing to the character of the District. As a result of that designation, any subsequent action affecting the District requires consultation with the Tennessee State Historic Preservation Officer.

Between 1994 and 1999 the Park proposed three separate plans for Elkmont, all of which were objected to by the State Historic Preservation Officer. The Advisory Council on Historic Preservation was also consulted regarding the last plan, and responded that the proposal constituted a new action when compared with the direction provided in the 1982 Plan. New consultation and a new planning process were begun in 2001. Incorporating requirements of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA) process was initiated to develop and determine the appropriate action for future management of the District.

OBJECTIVE AND SCOPE OF ANALYSIS

The overall goal of this project is to develop a full range of management alternatives under NEPA, to compare potential impacts that would result from implementation of each of the alternatives, and to select a preferred alternative that considers both agency and public comment. The alternative development process was based on a series of goal statements for the District. The primary goal identified is to "foster enjoyment, understanding, appreciation, and protection of natural and cultural resources both within Elkmont Historic District and Parkwide" by:

- *creating opportunities for emotional and intellectual connections to these resources;*
- *protecting and perpetuating the significant and diverse natural resources and ecosystems (including forest communities and water resources) found within Elkmont Historic District, keeping them free from impairment; and*
- *protecting and perpetuating the tangible (archeological sites, and historic building and structures, landscapes and features) and intangible (feelings of attachment and family*

life, myth, folklore and ideology) aspects of the cultural resources that comprise the District.

As stated in the 1982 Plan, the overall management objective for the Park is to "manage the Park in a manner consistent with the purpose of preservation, enjoyment and benefits to humankind through scientific study of its distinctive combination of natural and cultural resources". The 1982 Plan also includes management objectives prepared by the Park superintendent for each of the Park's resources. During the process of developing new management plan alternatives, management goals and objectives specific to various resources at Elkmont were refined to reflect current management direction.

Consistent with National Park Service (NPS) policy and the overall development of project goals and objectives, more specific cultural resource goals and management objectives were developed for the District by NPS with input from the public. Specific management objectives state that any historic resources selected for preservation should serve an agency need and should be adequately maintained. Buildings and associated landscape features would be retained in clusters and associations sufficient to provide a sense of character of the district. Management actions must be consistent with legislative and executive mandates as well as NPS policies in order to protect and perpetuate the significant and diverse natural resources and ecosystems found within the District and, where possible, restore the natural processes.

Guiding principles for visitor use and experience are to promote visitor activities at appropriate locations, levels, and times that minimize adverse impacts on Park resources, while achieving educational goals and ensuring that visitor access to adjacent use areas is adequately maintained.

ALTERNATIVES

Concurrent with development of project goals and objectives, potential uses for the District were considered. Park needs were examined to determine if the Park's proposed uses were compatible with the project goals and objectives, as well as the constraints and opportunities presented by District's natural and cultural resources, and location within the Park. The resulting potential uses for the District, as defined by the Park, were then considered along with uses identified by the public and the consulting parties. Consulting parties are defined in subsection 800.8(c)(2) of the National Historic Preservation Act.

The NPS planning team, with input from Park staff, members of the public and consulting parties, also identified a number of issues in regard to future management of the District. The primary concerns identified related to cultural resources, natural resources and visitor experience. The plan chosen for the District will provide guidelines for addressing specific issues, while adhering to the Park's mission, the vision for Elkmont and any laws or regulations that apply to Park planning procedures.

The project alternatives presented in this Draft Environmental Impact Statement were developed based on identified uses, incorporated in varying arrangements and degree of use to meet resource needs and are intended to represent a full range of possible actions designed to address the purpose and need for the project. The primary issues brought forth during formal

scoping centered on restoration of natural plant communities and various uses of the historic buildings, including curatorial storage and use as public lodging facilities. Because the true condition of the Wonderland Hotel was not completely understood until the project alternatives were developed, alternatives were adjusted prior to public scoping and impact analysis to reflect two options including complete removal of the building or reconstruction. Reconstruction requires approval by the Director of the NPS.

Seven detailed alternatives were developed to provide a full range of management options for the District. These alternatives include the No Action Alternative, as required by NEPA and Alternative A, a second alternative that follows the 1982 Plan, but also includes active restoration of natural resources. Alternatives B- F each propose incrementally greater preservation and reuse of District buildings for a variety of purposes as outlined below.

The **No Action Alternative** is tiered to and follows management direction described in the 1982 Plan. The 1982 Plan calls for removal of all buildings at Elkmont upon expiration of leases. While technically an "action", this direction maintains the current management plan for disposition of buildings at Elkmont and is considered no action based on current management policies. A physical "no action" that would permit buildings to simply decay in place, is not legal and was dismissed from consideration for two reasons. First, since Elkmont is listed as an historic district on the National Register of Historic Places, the Park is required to maintain properties until a management decision is made. Additionally, the Park is required to maintain safe conditions in developed areas of the Park and permitting structures to simply decay would create an unsafe environment for the visiting public.

As described in the 1982 Plan, under the No Action Alternative, all buildings and structures would be removed and the area would be allowed to return to a natural state. This alternative repeats previous management decisions by returning land to a natural condition, as was Park practice from the earliest days of establishment where buildings were removed. Where buildings are removed under this alternative, chimneys and other cultural landscape features would remain unless retention of these features would present a safety hazard.

No change in management direction as outlined in the 1982 Plan for the District would occur upon removal of buildings and structures. Visitor use, recreational opportunities and natural resource management would remain the same.

Alternative A proposes the greatest protection of natural resources and natural systems within the study area and calls for the removal of all buildings as outlined in the 1982 Plan. Alternative A improves upon the No Action Alternative by proposing active restoration of native plant species in all areas disturbed by previous human activity and occupation, including removal of buildings. Active restoration would include intensive removal of non- native species, and seeding and planting with native species collected and/or propagated from District species, followed by ongoing vegetation management to ensure appropriate conditions for plant reestablishment. Of particular interest in restoration efforts is the montane alluvial forest, a climax plant community type found in the District, primarily within the floodplains of the Little River and Bearwallow Creek, a tributary to the river. Because of previous disturbance from agricultural uses, followed by logging operations and then human development, this plant community type has been heavily impacted on this site. The montane alluvial forest is in the

early stages of succession at Elkmont but continues to experience ongoing impacts to understory plant regeneration as a result of decades of human activities that have prevented a full recovery of natural processes.

Alternative A proposes to create an environment conducive to the establishment of native plant communities in disturbed areas throughout the District. Active restoration of native plant communities would accomplish a variety of tasks including increasing species diversity, improving and increasing wildlife habitat and providing soil stabilization measures. Unlike the No Action Alternative, features such as rock walls and chimneys would be removed unless removal would cause undue ground disturbance.

Alternative B proposes to retain an example collection of historic buildings in one area of the District, including the Appalachian Clubhouse and 12 cabins, 11 of which are considered contributing elements to the character of the district. In all areas where buildings are removed, native plant communities and natural systems would be actively restored. Additionally, where buildings are removed, chimneys and other cultural landscape features would remain unless retention of these features would present safety hazards. The buildings proposed for retention would provide a contiguous collection of representative buildings restored on the exterior and the associated cultural landscape retained to represent a selected point from the period of significance. Interpretive features, such as wayside exhibits, would be introduced to describe features within the District.

The Appalachian Clubhouse would be rehabilitated on the interior for day use opportunities under special use permit. The restored and preserved cabins would function as a museum community. One hundred- six new parking spaces would be created in this alternative to accommodate day users within the District and to delineate specific parking for trails originating from Elkmont. Sensitive plant community types, such as montane alluvial forest, would be actively restored. Developed visitor uses would occur in other areas away from this forest type, permitting plants to regenerate without the pressure of visitation and associated impacts.

Alternative C is both the environmentally preferred and agency preferred alternative. This alternative proposes to retain the Appalachian Clubhouse and 16 historic buildings in the area immediately adjacent to the clubhouse known as Daisy Town. Fifteen of these 16 buildings are listed as contributing elements to the character of the District. The Daisy Town area represents the first portion of the resort community to be developed. Additionally, one cabin in the area known as Society Hill would be retained for the associative value with David C. Chapman, an important figure in the Park movement during the 1920s and 1930s. In all areas where buildings are removed, native plant communities and natural systems would be restored. Chimneys and other cultural landscape features would remain unless retention of these features would present a safety hazard.

The Appalachian Clubhouse would be rehabilitated on the interior for day use opportunities under special use permit. The restored and preserved cabins would function as a museum community. One hundred- six new parking spaces would be created in this alternative to accommodate day users within the District and to provide specific parking for trails originating from Elkmont. Sensitive plant community types, such as the montane alluvial forest, would be actively restored. Developed visitor uses would occur in other areas away from this forest type,

permitting plants to regenerate without the pressure of visitation and associated impacts. This alternative effectively strikes a balance between natural and cultural resources while permitting traditional uses and additional new uses to occur.

Alternative D proposes preservation of buildings in both the Appalachian and Wonderland Clubs. Under this alternative, two options exist for the Wonderland Hotel and Annex, including either complete removal of both or reconstruction of the Hotel and rehabilitation of the Annex for use as a curatorial facility for Park archived cultural resources. Six contributing cabins at the Wonderland Club would be retained for use as temporary housing for visiting scientists involved in Park- identified research functions. This alternative proposes to retain the Appalachian Clubhouse and 16 historic buildings, 15 of which are listed as contributing elements to the character of the District, in the area known as Daisy Town. One cabin with contributing status in the area known as Society Hill would be retained for the associative value with David C. Chapman. Another contributing cabin in the area known as Millionaire's Row along the Little River would be retained for the associative value with Colonel Wilson B. Townsend, President of the Little River Lumber Company. In all areas where buildings are removed, native plant communities and natural systems would be actively restored.

Restoration of natural resources would be limited to areas where buildings are removed in Millionaire's Row and Society Hill. Where buildings are removed, chimneys and other cultural landscape features would remain unless retention of these features would present a safety hazard.

The Appalachian Clubhouse would be rehabilitated on the interior for day use opportunities under special use permit. The restored and preserved cabins would function as a museum community. One hundred- nineteen to 169 new parking spaces would be created within the District to accommodate proposed uses and to provide specific parking for trails originating from Elkmont.

Alternative E also proposes two options for the Wonderland Hotel and Annex, including either complete removal of both or reconstruction of the Hotel and rehabilitation of the Annex for overnight lodging to be managed by a private concession operation. Seven cabins at the Wonderland Club, six of which are contributing elements to the District, would be rehabilitated for overnight use and managed by a private concession operation. A dining facility would also be developed at the hotel if it is reconstructed, but would be limited to overnight guests as part of the concession operation. Also, as part of the concession operation at the Wonderland Club, in-depth educational programs for overnight guests would be provided. Along the Little River in the area known as Millionaire's Row, all six contributing cabins, including the cabin associated with Colonel Wilson B. Townsend, President of the Little River Lumber Company, would be rehabilitated for use as temporary housing for visiting scientists involved in Park- identified research functions.

Alternative E proposes to retain the Appalachian Clubhouse and 16 historic buildings in the area known as Daisy Town. Fifteen of these buildings are listed as contributing elements to the character of the District. The Appalachian Clubhouse would be rehabilitated on the interior for day use opportunities under special use permit. The restored and preserved cabins would function as a museum community. One cabin with contributing status in the area known as

Society Hill would be retained for the associative value with David C. Chapman. One hundred-nineteen to 244 new parking spaces would be created within the District to accommodate proposed uses and to provide specific parking for trails originating from Elkmont. The existing sewage treatment plant that currently serves the campground would not be allowed to treat additional sewage loads above current permitted levels. The increased sewage loads into the system created by overnight use and restaurant operation under the hotel reconstruction option would necessitate an alternative means of sewage treatment.

Restoration of natural resources would be limited to areas where buildings are removed in Society Hill. In locations where buildings are removed, chimneys and other cultural landscape features would remain unless retention of these features would present a safety hazard.

Alternative F proposes the greatest retention and preservation of historic buildings in the District and allows for the least protection of natural resources of all proposed alternatives. Two options for the Wonderland Hotel and Annex are proposed, including either complete removal of both of these buildings or reconstruction of the Hotel and rehabilitation of the Annex for overnight lodging that would be managed by a private concession operation. Eight cabins at the Wonderland Club would be rehabilitated for overnight use by a private concession operation, six of which are contributing elements to the District. If the hotel is reconstructed, a dining facility, open to all Park visitors, would also be developed at the hotel as part of the concession operation.

Along Bearwallow Creek, a tributary to the Little River in the area known as Millionaire's Row, all six contributing cabins would be rehabilitated for use as overnight lodging as part of a concession operation and would include the cabin associated with Colonel Wilson B. Townsend. Twenty- two cabins in the area known as Society Hill, 15 of which are considered contributing to the character of the District, would be rehabilitated for overnight use as part of a private concession operation. One cabin with contributing status in the area known as Society Hill would be retained for the associative value with David C. Chapman.

This alternative proposes to retain the Appalachian Clubhouse and sixteen historic buildings in the area known as Daisy Town, fifteen of which are listed as contributing elements to the character of the District. The Appalachian Clubhouse would be rehabilitated on the interior for day use opportunities under special use permit. The restored and preserved cabins would function as a museum community. Two hundred- fourteen to 299 new parking spaces would be created within the District to accommodate proposed uses and to provide specific parking for trails originating from Elkmont. The existing sewage treatment plant that currently serves the campground would not be allowed to treat additional sewage loads above current permitted levels. The increased sewage loads into the system created by overnight use and restaurant operation under the hotel reconstruction option would necessitate an alternative means of treatment.

There would be little to no opportunity for restoration of natural resources and natural processes under Alternative F, as most buildings would be retained.

IMPACT TOPICS AND PLANNING CONSIDERATIONS

The issues brought forth for analysis in this Draft Environmental Impact Statement include:

- cultural resources
- wetlands
- floodplains
- water quality
- air quality
- biological resources
- terrestrial habitats and forest communities
- aquatic habitats
- endangered and threatened species
- fish and wildlife
- geology and soils
- transportation and access
- visitor use and experience
- soundscape
- viewshed
- land use - existing and historic
- social and cultural patterns
- impacts to the General Management Plan
- economics
- appropriate and necessary (NPS policy and mission)

Upon review of the listed issues for analysis, several topics have required special consideration. The study area is listed as an historic district on the National Register of Historic Places affording buildings special status. The National Park Service is tasked with protecting these resources and any action affecting listed buildings require consultation with the Tennessee State Historic Preservation Officer and the Advisory Council on Historic Preservation. The Little River flows directly through the center of the District and is designated an Outstanding National Resource Water with Tier III status. This designation strictly prohibits permitting new or expanding point source discharges and can greatly limit adjacent land use and development that may create additional non- point source pollutants. A plant community type known as montane alluvial forest occurs in several areas within the study area. This community type is listed as globally imperiled with only 6 to 20 known sites in the world. The Park purpose and significance have also been considered in the analysis, as have the issues of operations and maintenance and the future commitment of resources.

ENVIRONMENTAL CONSEQUENCES

No Action Alternative

The greatest impacts under this alternative would be to the National Register- listed Historic District. While many components of the cultural landscape would remain, historic buildings provide the greatest definition to the cultural landscape and removal of these elements would

significantly alter the historic landscape for which the District is listed. The result of implementing this alternative would be an irretrievable commitment of cultural resources through the permanent removal of historic buildings. The overall long- term productivity of all biotic resources would benefit from the increase in land available for restoration of sensitive native plant communities, particularly the globally imperiled montane alluvial forest. Water resources related to the Little River, a designated Outstanding National Resource Water, would also be protected under this alternative. Visitor use would not be impacted. Park operations and maintenance would benefit from this alternative.

Alternative A

Similar to the No Action Alternative, the greatest impacts under this alternative would be to the National Register- listed Historic District. While many components of the cultural landscape would remain, historic buildings provide the greatest definition to the cultural landscape and removal of these elements would significantly alter the historic landscape for which the District is listed. The result of implementing this alternative would be an irretrievable commitment of cultural resources through the permanent removal of historic buildings.

As a result of active restoration of natural resources, these resources would be improved to the greatest extent possible under this alternative. The overall long- term productivity of all biotic resources would benefit from the increase in land available for restoration of sensitive native plant communities, particularly the globally imperiled montane alluvial forest, and from implementation of a comprehensive non- native, invasive plants management plan. Water resources related to the Little River, a designated Outstanding National Resource Water, would also be protected under this alternative.

Visitor use would not be impacted. Overall impacts to Park operations and maintenance would be beneficial. As a result of implementing this alternative, visitor use activities are not expected to increase above existing levels. Pedestrian circulation would utilize existing roadways, also aiding in minimization of impacts to natural systems.

Alternative B

The greatest impacts under this alternative would be to the National Register- listed Historic District. While many components of the cultural landscape would remain, including the Appalachian Clubhouse and eleven contributing buildings, the majority of contributing buildings in the District would be removed. The buildings retained would provide a representative example of the resort community and architecture in one area of the District. Historic buildings provide the greatest definition to the cultural landscape and removal of many of these elements would significantly alter the historic landscape for which the District is listed.

Where buildings are removed, natural resources would be actively restored. The overall long-term productivity of all biotic resources would benefit in the most sensitive areas due to the increase in land available for restoration of sensitive native plant communities, particularly the globally imperiled montane alluvial forest. Additional sewage loads would be added to the existing campground wastewater system from the day use facility at the Appalachian Clubhouse, but would be a small enough increase that permitted discharge levels would not be exceeded. A

negligible increase in non- point source pollutants to water resources would be added as a result of a small increase in surface water runoff.

As a result of implementing this alternative, there would be a minor increase in visitation associated with new uses. Park operations and maintenance would be impacted by the uses associated with the Appalachian Clubhouse and museum community in Daisy Town. A total of 106 new parking spaces would be created, but otherwise, pedestrian circulation would utilize existing roadways and gravel pathways.

Alternative C

This alternative strikes a balance between natural and cultural resources. Some of the most important resources are preserved in this alternative including the original portion of the resort community, the Chapman cabin and the dominant area of montane alluvial forest currently occupied by buildings. While many components of the cultural landscape would remain, including the Appalachian Clubhouse and fifteen contributing buildings, nearly two- thirds of the contributing buildings in the District would be removed. The buildings retained would preserve the original core of the resort community.

Where buildings are removed, natural resources would be actively restored. The overall long-term productivity of all biotic resources would be benefited in the most sensitive areas due to the increase in land available for restoration of native plant communities, particularly the globally imperiled montane alluvial forest. Additional sewage generated by the day use facility at the Appalachian Clubhouse would be added to the existing campground wastewater system, but this increase would be small and within currently permitted discharge levels. A negligible increase in non- point source pollutants to water resources would be added as a result of increased use.

As a result of implementing Alternative C, there would be a minor increase in visitation associated with new uses. NPS operations would benefit from revenue realized as a result of the Appalachian Clubhouse being used as a public day use rental facility in addition to a general reduction in deferred maintenance with the removal of buildings. A total of 106 new parking spaces would be created, but otherwise, pedestrian circulation would utilize existing roadways and gravel pathways.

Alternative D

This alternative preserves cultural resources in all areas of the District. A majority of the contributing elements in the District would remain, including the Appalachian Clubhouse and 15 adjacent contributing buildings, cabins associated with David C. Chapman and Colonel Wilson B. Townsend, as well as all contributing cabins in the Wonderland Club. Under one option, the Wonderland Hotel would be reconstructed and Annex retained and rehabilitated to provide a curatorial storage facility, but reconstruction of the hotel would require approval by the Director of the National Park Service. Five contributing cabins in Millionaire's Row and sixteen contributing cabins in Society Hill would be removed.

A portion of montane alluvial forest currently occupied by buildings would be impacted by retention of the cabin associated with Colonel Wilson B. Townsend, but the remaining area would be restored. Where buildings are removed, natural resources would be actively restored. The overall long- term productivity of all biotic resources would be benefited in the most sensitive areas due to the increase in land available for restoration of native plant communities, particularly the globally imperiled montane alluvial forest. A minor increase in wastewater would be added to the existing campground wastewater system from the day use facility at the Appalachian Clubhouse, overnight use at Wonderland cabins and from the curatorial facility (if the hotel was reconstructed). This increase would require a flow equalization basin to be constructed at the sewage treatment plant, but the overall increase in wastewater would not exceed currently permitted discharge levels. A negligible increase in discharge of non- point source pollutants to water resources would be added as a result of increased use.

As a result of implementing Alternative D, there would be a minor increase in visitation associated with new uses. Park operations and maintenance would be impacted by the uses associated with retained buildings. One hundred- nineteen to one 169 new parking spaces would be created, and some new roadway modifications would be required.

Alternative E

This alternative preserves cultural resources in all areas of the District. A majority of the contributing elements of the District would remain, including the Appalachian Clubhouse and 15 adjacent contributing buildings, six contributing cabins in Millionaire's Row including the cabin associated with Colonel Wilson B.Townsend, the cabin associated with David C. Chapman, and all contributing cabins in the Wonderland Club. The Wonderland Hotel and Annex would be removed under option E1. Under option E2, the Hotel would be reconstructed and Annex retained for overnight lodging, but reconstruction would require approval by the Director of the NPS. Sixteen contributing cabins in Society Hill would be removed.

The portion of montane alluvial forest currently occupied by buildings in Millionaire's Row would be impacted by the retention of these cabins for use as temporary housing for visiting scientists. The occupation of buildings and associated maintenance in the montane alluvial forest would adversely impact this sensitive plant community considerably. In Society Hill, where buildings are removed, natural resources would be actively restored. A moderate increase in wastewater would be added to the existing campground wastewater system under E1, but this increase would be permissible under existing permits provided that the existing treatment plant is upgraded. Option E2 would create a major increase in wastewater requiring an alternative means of treatment outside the existing wastewater treatment facility. A minor increase in discharge of non- point source pollutants to water resources would be result from increased visitation and use. Additionally, three buildings proposed for retention in Millionaire's Row lie within the 100- year floodplain, immediately adjacent to identified wetlands.

As a result of implementing Alternative E, there would be a moderate increase in visitation associated with new uses. Park operations and maintenance would be adversely impacted by the uses associated with retained buildings in addition to the need for management of the private concession operation. One hundred- nineteen to 244 new parking spaces would be

created, and some roadway modifications and additions would be required, including a new bridge over the Little River.

Alternative F

This alternative preserves cultural resources in all areas of the District. Most contributing elements in the District would remain in this alternative, as well as many non- contributing buildings for use by overnight visitors. The Wonderland Hotel and Annex would be removed under option F1. Under option F2, the Hotel would be reconstructed and Annex retained for overnight lodging, but reconstruction would require approval by the Director of the NPS.

No portion of montane alluvial forest within the District would be restored. Occupation of buildings and associated maintenance in the montane alluvial forest would adversely impact this sensitive plant community. A major increase in wastewater would be added to the existing campground wastewater system under F1 and F2. As a result of increases in wastewater from intensive new uses, all additional wastewater generated above permitted levels would require alternative treatment. A minor increase in non- point source pollutants to water resources would be added as a result of increased use. Additionally, three buildings proposed for retention in Millionaire's Row are located in the 100- year floodplain, immediately adjacent to identified wetlands.

As a result of implementing this alternative, there would be a major increase in visitation associated with new uses and the intensity of visitation would likely create moderate to major impacts on natural and cultural resources in addition to impacting visitor experience. Adverse impacts to Park operations and maintenance would be created by the uses associated with retained buildings in addition to the need for management of the private concession operation. One hundred- nineteen to 299 new parking spaces would be created, and some new roadway modifications would be required including a new bridge over the Little River.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Addressing Section 101 of the National Environmental Policy Act:

When considering all factors described in this analysis collectively, and seeking a management plan "in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony", Alternative C was selected as the Environmentally Preferred Alternative. Alternative C "best protects, preserves and enhances cultural, historic and natural resources" in the Elkmont Historic District by causing "the least damage to the biological and physical environment".

Alternative C actively restores native plant communities in all locations where buildings are removed and in areas previously impacted by human activity, providing for the long- term productivity of biotic resources. In particular, this alternative provides a long- term benefit to the globally imperiled montane alluvial forest by permitting this resource to become reestablished in areas and redirecting human activity to areas that will not directly conflict with this resource.

This alternative retains, restores and preserves National Register listed buildings and cultural landscape features in the Appalachian Club portion of the District. The portion of the District in which cultural resources will be restored is at a size that will ensure an appropriate level of ongoing preservation without further burdening park operations. At the same time, Alternative C achieves a wide range of visitor uses and opportunities for visitor understanding of natural and cultural resources. The retained cultural components and other resources within the District are expected to accommodate visitation levels without experiencing major adverse impacts. A minor increase in visitation above current levels would occur as a result of implementing this alternative. Impacts to the Little River, listed as an Outstanding National Resource Water, would be negligible from both point and non- point pollution sources. Long-term, moderate benefits to Park operations would be achieved as the current level of effort to maintain buildings in a stabilized state of repair would be greatly reduced, as would the level of patrol required and the amount of safety hazards to the visiting public. Most impacts would be short- term and, with the exception of permanent impacts to contributing buildings, all other impacts would be minor to negligible.

SELECTING THE AGENCY PREFERRED ALTERNATIVE - CBA

To select the preferred alternative for the Elkmont Draft Environmental Impact Statement/General Management Plan Amendment, the NPS employed the use of the "Choosing By Advantages" or "CBA" decision- making process. This decision- making process analyzed the advantages of each alternative and considered the potential beneficial and negative impacts in order to quantify and rank total advantages for each alternative. A cost/benefit analysis was then applied and the preferred alternative was selected.

The seven project alternatives were considered and each was individually evaluated under four categories, defined as "factors" in the CBA process. The four factors assessed were Protection of Natural Resources, Protection of Cultural Resources, Provision for Visitor Education and Enjoyment, and Protection of Public Health, Safety and Welfare, ranked for importance in that same order. Rank was based on Park purpose, legal requirements, policy and guidelines. Benefits, defined as advantages in this process, were calculated for each alternative within each factor. Individual scores for each alternative derived from each separate factor were then tallied into one combined summary as a means of ranking alternatives with all factors considered for total advantages. Once overall ranking was established, a cost- benefit analysis was applied to ranked alternatives based on the total cost of each alternative. The preferred alternative was selected based on a value ratio that calculated the alternative with the greatest benefits or advantages as compared to the cost.

Of the seven alternatives, Alternative C was selected as the agency preferred alternative. Prior to conducting a cost/benefit analysis it appeared that Alternative D was the most advantageous of all alternatives when other factors were considered irrespective of costs. When associated costs for each alternative were considered, there was a substantial increase in costs from alternative C to D. This cost increase, in conjunction with comparison of all other factors in the analysis illustrated that alternative C provided the most benefit for the cost. Alternative C achieves a strong balance between all factors considered, particularly concerns in regards to potential impacts to cultural and natural resources.

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National Park Service
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Elkmont Historic District
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1.0 PURPOSE AND NEED FOR THE PLAN

Purpose

The purpose of this environmental planning initiative is to reevaluate the current management strategy for the Elkmont Historic District (District) as articulated in the Great Smoky Mountains National Park General Management Plan approved and published in 1982 (NPS 1982).

Need for Action

There are 74 buildings, including cabins, outbuildings, a clubhouse (Appalachian Clubhouse) and a hotel (Wonderland Hotel), as well as a number of other structures (bridges and water tanks) in the Elkmont Historic District of Great Smoky Mountains National Park (Park) in Sevier County, Tennessee. Until December 1992, those buildings were under the lease of the Elkmont Preservation Committee (EPC). With the exception of three buildings vacated in 1996 and 2001, all of the buildings in the District have been vacant since 1992. Based upon direction in the 1982 General Management Plan (1982 Plan), the Park had planned to remove all of the buildings once their leases expired, allowing the area to return to a natural state (NPS 1982). The 1982 Plan classifies Elkmont as a developed area and the only other action proposed in addition to removal of the buildings is construction of a picnic shelter. The 1982 Plan states:

> Leases for approximately 50 structures occupied by the Elkmont Preservation Committee (cabins and the Wonderland Hotel) will expire in 1992, and four remaining leases will expire in 2001. None of these leases will be extended and the structures are proposed for removal on termination of the leases. Building sites will be returned to a natural state.

However, in 1994 the Elkmont community was listed on the National Register of Historic Places (National Register) as an historic district, with 49 of the 74 structures listed as contributing to the character of the District. As a result of that designation, any subsequent action affecting the District requires consultation with the Tennessee State Historic Preservation Officer (SHPO). Consequently, in 2001 the Park initiated the environmental planning process to reevaluate the strategy provided in the 1982 Plan and to develop a new plan for managing the Elkmont Historic District that takes its listing on the National Register into consideration..

Three different plans for management of the District were proposed by the Park between 1994 and 1999. The original plan provided in the General Management Plan, which called for removal of all of the historic buildings, was objected to by the SHPO. The Park subsequently proposed two additional management plans to the SHPO and the Advisory Council on Historic Preservation. The second plan was objected to by both agencies and the agencies felt that the third plan constituted a new action that would require initiation of a new consultation process.

As a result, the Park initiated the National Environmental Policy Act (NEPA) process. This process is designed to be comprehensive, incorporating public input, National Historic Preservation Act (NHPA) regulations, environmental laws, and other laws, policies and guidelines dealing with cultural and natural resources. The Park initiated this environmental planning process to develop and assess alternatives, and to determine the future management direction for the District.

This document is organized in the following order:

- Chapter 1 provides background on the Elkmont Historic District, the Environmental Impact Statement process and public involvement efforts.

- Chapter 2 provides a complete description of the project alternatives. The specifics of each alternative are presented in their entirety and summarized in tabular format. Summary tables at the end of the chapter are organized to allow comparison between project alternatives.

- Chapter 3 contains information on the affected environment (existing condition) and describes resources that could be affected during project implementation.

- Chapter 4 describes the environmental consequences associated with implementing each alternative.

- A group of appendices follows Chapter 4 and contains information on legislation guiding this planning process, a cultural landscape assessment of the Elkmont Historic District, estimated costs associated with each alternative proposed in this document, visual quality exhibits, research needs and action plans, and a list of consulting parties for the Elkmont project.

1.1 Background and Analysis

The purposes of NEPA are "To declare a national policy which will encourage production and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality" (40 CFR 1500.2).

Under NEPA, the current planning process was begun as an Environmental Assessment (EA) and a possible amendment to the General Management Plan. Due to the complex nature of the issues surrounding the District, as well as the level of controversy associated with potential project alternatives, the NPS subsquently elevated the EA process to an Environmental Impact Statement (EIS). The EIS process began in 2003 and has allowed for additional public involvement and more in- depth analysis of the issues. This document is being prepared under NEPA and Council on Environmental Quality guidelines. Because cultural resource issues are related to the core purpose of the project, requirements of the National Historic Preservation Act have been fully considered and integrated into this planning process.

Prior to initiating the formal NEPA process, the Park formed a Consulting Parties group (see Appendix F), as required by the NHPA and "Protection of Historic Properties" (36 CFR Part 800.2 (c)). This group is composed of a diverse group of stakeholders and agencies that provide input on the issues concerning the eventual management of the District. In addition to formal NEPA and NHPA requirements, the Park has established an extensive public involvement process to solicit public input regarding issues that

should be considered as part of the planning process. The intent of the comprehensive public participation incorporated into this planning process and described in this document is to ensure the NPS, as the steward of our national heritage, cultural traditions and community surroundings, fully understands and considers the public's interest. As part of the evaluation process for the District, a variety of natural and cultural resource investigations have been conducted. Using this information, a full range of reasonable management actions was identified and analyzed in concert with the Park's mission and reflective of stakeholder interests as identified during the public involvement process.

Work to evaluate the historic buildings at Elkmont has been on- going since the late 1990s and has continued during the planning process. Due to the deteriorating condition of many of the buildings, emergency stabilization measures have been taken by the Park and because the condition of the buildings is changing over time, a number of assessments of their structural stability have been undertaken. At the request of the Park, the NPS Historic Preservation Training Center (HPTC) completed Historic Structures Assessment Reports for the Appalachian Clubhouse in 1998 and the Wonderland Hotel in 2001. The 2001 assessment for the hotel included only an exterior existing condition assessment and stabilization plan. The 2001 report did not investigate interior conditions and did not include an engineering analysis. The assessment team stated that, by employing stabilization methods outlined in the report, that the hotel could possibly still be stabilized, but that this must occur within two years. The Park employed many of the stabilization techniques prescribed in the report, but as Park preservation crew members were repairing the roof, it was discovered that there was more extensive structural damage and failure than was previously detected. In the winter of 2002, it became apparent that another assessment of the hotel would be necessary.

In April 2003, another assessment of the Wonderland Hotel was completed by the HPTC. The assessment indicated that surface materials (carpeting, drywall and dropped ceilings) covering the structure had prohibited a complete investigation from being performed in 2001. The report further concluded that the interior structure in many areas had most likely already failed when the 2001 report was completed and that the overall structural stability of the Wonderland Hotel in 2003 was "serious" and should be classified as "failed". In August 2005, the majority of the hotel building collapsed due to the failed structural system.

1.2 Overview

The Department of the Interior (Department), under which the NPS functions, is the nation's primary conservation agency and acts as a steward for most of our nationally-owned public lands and natural resources. The mission of the Department includes "*fostering sound use of our land and water resources; protecting our fish, wildlife and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation*" (NPS 2004a). The Department holds the responsibility of assessing resources and strives to ensure that their use and/or development are in the best interest of all citizens by encouraging stewardship and public participation in their care.

In order to achieve the objectives of the National Park Service mission, each National Park is required to develop a General Management Plan to provide guidance in making decisions concerning management of its resources. The plans are designed to be used for 15 to 20 years. Although much of the 1982 Plan for Great Smoky Mountains National Park is still useful, issues concerning the Elkmont Historic District could not be addressed properly without additional investigations, due to the subsequent listing of the District on the National Register. As its primary purpose, this document proposes and assesses a full range of alternatives that recognize this change so that a management plan for the District can be determined and implemented. Chapter 4 describes the varying degrees and different ways that individual resources would be impacted depending on the specific alternative proposal. The goal of this Environmental Impact Statement is to provide guidance to aid in discerning the best balance between resource impacts and achieving the goals and objectives for the District.

1.2.1 Location and Brief Description

Great Smoky Mountains National Park is located in east Tennessee and southwestern North Carolina in the southern portion of the Appalachian mountain range (Figure 1- 1, p.5). The Park contains almost equal parts in Tennessee and North Carolina, with the northern half in Blount, Sevier, and Cocke counties, Tennessee and the southern half in Swain and Haywood counties, North Carolina (NPS 1982).

The Park area has been occupied by humans for at least the past 10,000 years (Bass 1975; Webb 2002). Although it is difficult, if not impossible, to assign tribal affiliations to the earlier prehistoric American Indian occupants, by at least the fifteenth to sixteenth century the area was occupied by Iroquois- speaking Cherokee populations. No major Cherokee towns are known to have been located within the Park; however, sizeable settlements were present along many of the surrounding drainages. The Cherokee towns along the Little Tennessee and adjacent rivers in what is now East Tennessee were known as the Overhill Towns, while the Out Towns were situated in the Tuskeegee drainage on the North Carolina side of the Park (Greene 1996; Schroedl 2000; Smith 1979).

The first European explorers entered the area in the mid- 1500s, but probably crossed the Appalachians to the north of the Park (Hudson 1990, 1997). Sustained European contacts with the Cherokees did not begin until after the settlement of Charleston (South Carolina) in 1670, but by the mid- 1700s the increasing European settlement pressure and accompanying spread of introduced diseases had caused major disruptions to the Cherokee populations. A series of land cessions throughout the late 1700s and early 1800s culminated in the 1835 Treaty of New Echota and resulted in the loss of most Cherokee lands in the east, although a number of Cherokees remained in the area. The Cherokees that continued to live in the area formed the nucleus of what is now the Eastern Band of Cherokee Indians (Finger 1984; Royce 1884).

The earliest European settlement of the immediate Park vicinity occurred during the late 1700s (Lambert 1958a; Pace 2001; Webb 2004), although the more mountainous interior of the region was settled later. However, some areas were not occupied until well into the nineteenth century. The early European inhabitants were primarily small farmers,

many of whom supplemented their incomes by raising and selling livestock and through small- scale mercantile establishments. The more fortunate settlers farmed the richer and more easily cultivated soils found on the floodplains and in the larger coves, and raised crops such as corn, wheat, rye, and oats. Cattle and hogs were also raised and for many years were given free rein. Much of the corn was ground into meal for human consumption, and the remainder used as fodder for the cattle, hogs, and work animals.

Small- scale logging took place in many parts of the Smoky Mountains during the late 1800s, but sizeable operations did not occur until the advent of mechanized, railroad logging in the early 1900s. Several large logging companies operated in the region during the 1910s and 1920s, including the Little River Lumber Company in the Elkmont area. Many of these companies ceased operations in the area by the late 1920s, although a few (including the Little River Lumber Company) continued operations into the 1930s (Lambert 1958b, 1961; Weals 1993).

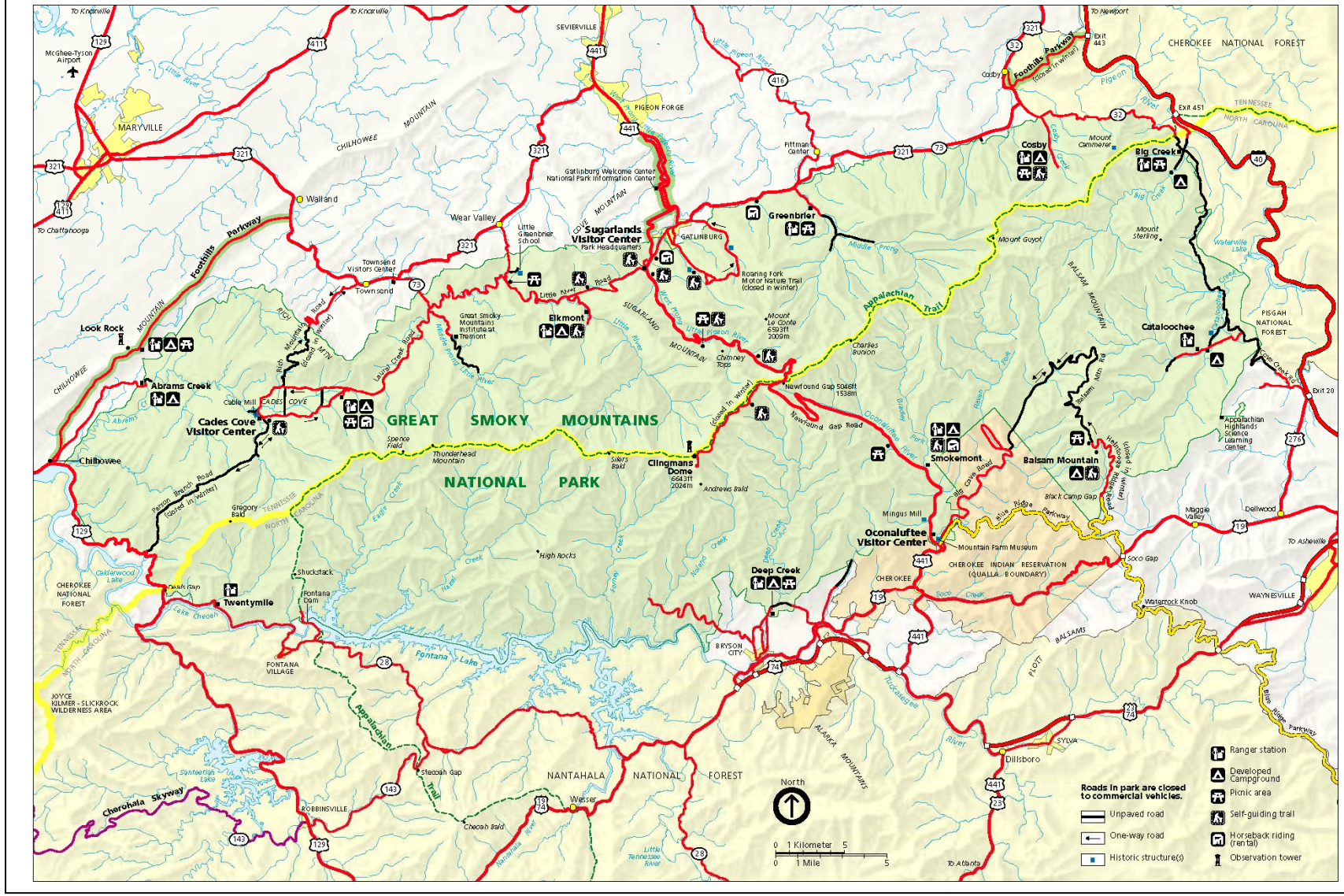
The idea for a National Park in the southern Appalachians had originated in the late 1800s (Taylor 2001), but gained momentum in the early 1920s with the recognition by preservationists of the environmental degradation caused by large- scale logging and recognition by businessman and government officials of the economic potential of such a park (Pierce 2000; Taylor 2001). Congress passed the Swanson- McKellar Bill in 1925 authorizing investigation and determination of Park boundaries, and for State Commissions to begin collecting donations to purchase land for a National Park in the Smoky Mountains. In the spring of 1926, legislation was passed in Congress and signed by President Calvin Coolidge providing for the establishment of Great Smoky Mountains National Park, and the Tennessee and North Carolina Parks Commissions began acquiring land throughout the area. The NPS began administration of an initial 150,000 acres within the Park in 1930, and the Park was officially established in 1934 (Pierce 2000).

1.2.1.1 The Park

The landscape in Great Smoky Mountains National Park is mountainous with the highest peak, Clingmans Dome, reaching 6,643 feet and the lowest elevation at 840 feet (APN 2004). Its natural environment includes one of the most diverse arrays of plant and animal species in the country. It is one of only nine National Park units designated as both an International Biosphere Reserve (1976) and a World Heritage Site (1983). Biosphere Reserves are areas of terrestrial and coastal ecosystems that are internationally recognized within the framework of UNESCO's Man and Biosphere Program. Sites on the World Heritage list are cultural and/or natural properties recognized by the World Heritage Committee as being of outstanding universal value. These dual designations recognize the abundance and diversity of the plant communities and complex geology protected within the Park.

There are two educational facilities in the Park, including the Great Smoky Mountains Institute at Tremont on the Tennessee side of the Park and the Appalachian Highlands Science Learning Center at Purchase Knob on the North Carolina side along the southeastern border of the Park.

Figure 1- 1: Great Smoky Mountains National Park



One very important study being conducted at Great Smoky Mountains National Park is the All Taxa Biodiversity Inventory. The purpose of this inventory, which began in 1997, is to identify all the species within the Park. The inventory is expected to be used as a model for other reserves. As a result of this investigation, as of 2004, 3,358 new records of species occurrence had been documented and 543 species new to science had been discovered (DLA 2004).

The Park covers 521,495 acres, received over nine million recreation visits in 2003, and had an annual budget of $16,600,000 for the 2004 fiscal year (NPS 2005). Three visitor centers are located in the Park at Sugarlands, Cades Cove and Oconaluftee. Information about the Park is provided through use of displays, videos, books, guides, a web site and maps. In addition, rangers and volunteers are available to help visitors get the most from their time in the Park. There are seven ranger stations in the Park located at Abrams Creek, Cades Cove, Elkmont, Smokemont, Deep Creek, Big Creek and Cataloochee. The main road through the Park, Newfound Gap Road (U.S. 441), is a well- known scenic drive that provides views of wildflowers, flowering trees, changing fall leaf colors, mountains and historic buildings. Other Park roads also allow drivers to observe the Park's natural and cultural resources and provide connections to trails and paths.

The Park contains the following six historic districts either on or nominated for the National Register:

- Roaring Fork
- Cades Cove
- Bud Ogle Farm
- Oconalulftee Archeological District
- Elkmont
- Cataloochee (nominated)

In addition, there are numerous historic buildings, some of which are listed on the National Register*. These include:

- Mayna Treanor Avent Studio
- Hall Cabin
- Alex Cole Cabin
- Little Greenbrier School/Church
- King- Walker Place
- Messer Barn
- John Ownby Cabin
- Oconaluftee (Smokemont) Baptist Church
- Mingus Mill (nominated)
- Tyson McCarter Place
- Jim Hannah Cabin (nominated)
- Little Cataloochee Baptist Church (nominated)

*The National Register list can be accessed at the NPS website http://www.cr.nps.gov/nr/ and also at private websites such as http://www.nationalregisterofhistoricplaces.com.

The Appalachian National Scenic Trail traverses the Park for approximately 70 miles, primarily along the ridge that constitutes the border between Tennessee and North Carolina. Horseback riding, bicycling and backcountry hiking are some of the activities enjoyed by Park visitors (NPS 2003a). Over 800 miles of trails are available to visitors on horseback or walking, as well as 1,108 campsites, 1,008 of which are developed. Approximately 1,600 species of flowering plants, including over 100 species of native trees; 200 species of birds; approximately 80 species of fish; 60 species of mammals; and 31 species of salamanders are found in the Park (Nichols Pers. comm. 2004).

1.2.1.2 The Site

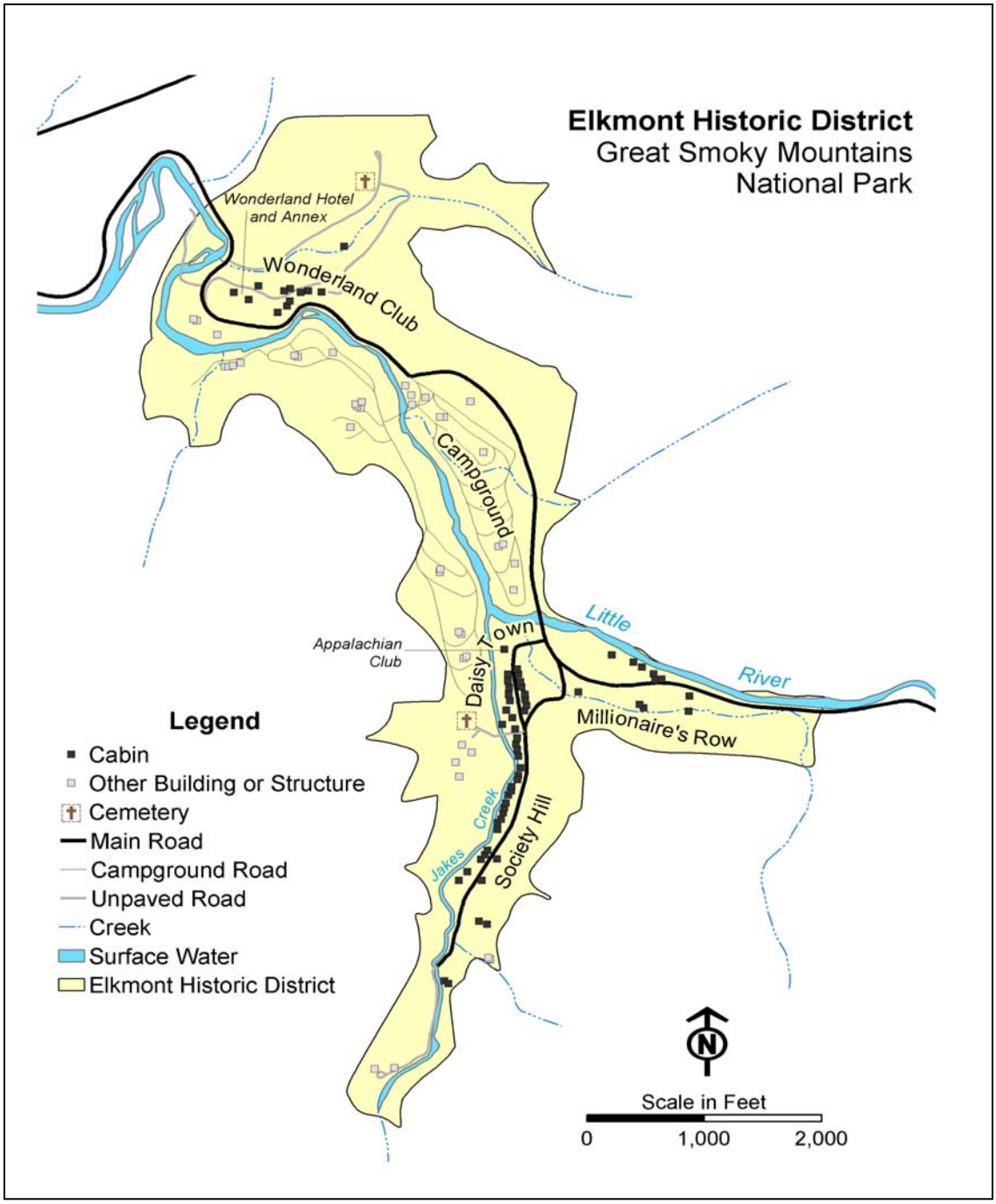
The Elkmont Historic District (Figure 1- 2) is located in Great Smoky Mountains National Park along the Little River in Sevier County, Tennessee. It is approximately 6 miles from the Sugarlands Visitor Center, which is 2 miles from the City of Gatlinburg, one of the Park's gateway communities. A complete discussion of the site history, from the time of prehistoric occupation up to present day conditions is provided in Section 3.1.

The Little River Lumber Company was founded in 1900 to log the Little River drainage, and by 1903, the company had constructed a large sawmill at Townsend, in Tuckaleechee Cove southwest of Elkmont. By 1908, the company had extended a railroad line through the Little River's narrow East Prong gorge to property it purchased at Elkmont. The community of Elkmont soon developed as an "important facility for both railroad and lumbering operations" (Schmidt and Hooks 1994), as it constituted the point at which logs were transferred from the geared engines used in steep topography to the rod engines used on the flatter run between Elkmont and Townsend (Schmidt and Hooks 1994). Although the railroad was built to transport timber, the railroad company began promoting its use by encouraging recreationists to come to the mountains. Hunting and fishing were two of the most popular activities, as the area provided an ample supply of trout, bear, deer and small game animals.

The Little River Lumber Company promoted development of the cutover land and, in 1910, deeded approximately 50 acres along Jakes Creek, just upstream from the community of Elkmont, to the Appalachian Club, chartered as a sportsman's club. The lumber company retained timber and mineral rights, while the Appalachian Club constructed a clubhouse at its own expense. The club's membership consisted primarily of sportsmen from Knoxville's business community, but later on it became increasingly centered on social activities. Eventually, prominent citizens primarily from Knoxville, Maryville and Chattanooga became club members. Some of the members began to build cottages near the Clubhouse.

The Town of Elkmont included homes inhabited by lumbermen and their families. It also included a general store, post office, boarding house, church and theater. In ca. 1911, the Wonderland Park Company, created by C.B. Carter and his two brothers, purchased a 65- acre piece of land north of the Town of Elkmont. The following year, the Carters constructed the Wonderland Park Hotel. In 1915, after the sale of the hotel and adjacent land and buildings to a group of Knoxville citizens, a new private club was formed called the Wonderland Club. Initially, the club was open only to its members, who used the area for recreational pursuits including hunting, fishing, and hiking on nearby trails.

Figure 1- 2: Elkmont Historic District



Built in 1912 as an exclusive membership club, the Wonderland Club eventually opened its hotel to the public several years later. Conflicts between residents of the Elkmont area developed at the time that the NPS was considering establishment of a new national park. These conflicts arose between those who wanted the area to be managed as a national forest and those who wanted the land preserved as a national park. Eventually, the national park proposal prevailed (Thomason et al. 1993; Cleveland 2004).

During the 1920s and 1930s, when the states of North Carolina and Tennessee began acquiring land for the Park, residents of these lands, including those in Elkmont, were offered the option of selling their properties outright or accepting a lesser payment in conjunction with a lifetime lease to the property. Acquisition of this property is described in more detail in Section 1.2.4. From 1972 until December 1992, the remaining buildings in Elkmont were under the lease of the Elkmont Preservation Committee (EPC). With the exception of three buildings vacated in 1996 and 2001, all of the buildings in the District have been vacant since 1992. Based upon direction in the 1982 General Management Plan (1982 Plan), the Park had planned to remove all of the buildings once their leases expired, allowing the area to return to a natural state (NPS 1982). However, prior to implementation of this plan, the Elkmont Historic District was nominated to the National Register of Historic Places.
The National Register nomination for the Elkmont Historic District was prepared during the spring and summer of 1993 and was based on survey work undertaken in 1992 and early 1993 (Thomason et al. 1993). The District was recommended as significant under National Register of Historic Place's Criteria A (event) and C (design/construction). These criteria are described further in Section 1.3.1. Finalizing the nomination involved intensive consultation and negotiation between the Park, the Southeast Regional Office of the NPS, and the Tennessee SHPO to arrive at consensus. During the consultation period, the various buildings, structures, and aboveground sites within the District were determined by the agencies to either be contributing or non-contributing components to the District's significance.

In 1994, following determination of the status of the buildings and structures, the District was listed on the National Register, with 49 of the 74 buildings determined to be contributing to the District's significance. In general, the boundary of the District follows the 2,400- foot contour line, but also utilizes streams, roads and trails and follows the 2,200- foot contour line along the western border. The boundary was drawn to include the area of the former Town of Elkmont that is now occupied by the campground. It also includes land that surrounds extant buildings, structures and features, and the area where buildings and structures were formerly located (Thomason et al. 1993; Cleveland 2004).

Most of the structures are situated on alluvial (or colluvial) flats and benches along the confluence of Little River and Jakes Creek. The Little River is a pristine waterway and is classified as an "Outstanding National Resource Water" (ONRW). Its ONRW status provides legal protection against degradation of its water quality. In addition, a preliminary survey of the area revealed several natural plant communities, including a community type commonly referred to as "montane alluvial forest." Natural communities are described and ranked for rarity in The Nature Conservancy's National Vegetation Classification System. The montane alluvial forest at Elkmont is classified as a very rare, globally imperiled community. These aspects of the District environment and other features are discussed in detail in Chapter 3.

1.2.2 Enabling Legislation

This planning process was undertaken in compliance with environmental legislation enacted by the U.S. Congress and under directives issued by the NPS. Applicable legislation is listed below.

- Organic Act of 1916 (16 USC 1 43 and USC 1 et. seq. 1926)
- 1926 and 1934 Enabling Legislation
- National Environmental Policy Act (NEPA) (40 CFR 1500- 1508) (1969)
- National Historic Preservation Act of 1966 (NHPA), as amended (16 USC 470 et. seq.)
- Regulations of the Council on Environmental Quality (CEQ)
- NPS Director's Orders

1.2.2.1 Organic Act of 1916 (16 USC 1 43 and USC 1 et. seq. 1926)

The legislation that provided for establishment of the Park emphasizes the obligation to ensure that administrative, resource protection and development actions in the Park are consistent with provisions in the 1916 Organic Act, which created the NPS. The act describes the primary mission of national parks, monuments and reservations as follows:

> [The National Park Service] shall promote and regulate the use of the federal areas known as national parks, monuments and reservations hereinafter specified….by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (16 USC 1).

Thus, the Organic Act established the fundamental purpose of all national parks as conservation of park resources and values. However, the law also provides Park managers with some discretion and the NPS' *Management Policies* (NPS 2000) "allow impacts to Park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values".

NPS management goals and objectives are guided by standards outlined in the 2001 edition of NPS *Management Policies* and were created for the purpose of providing direction for the establishment and administration of the national park system. The policies were developed with input from National Park Service staff and other individuals and organizations that are concerned with the well- being of the parks and the programs provided by them. As stated above, the overriding goal of the *Management Policies* is to thoughtfully carry out the NPS mission (NPS 2000).

1.2.2.2 1926 Enabling Legislation

16 USC 403 created the Park as recommended by the Secretary of the Interior's April 14, 1926 report. Acquisition of park land was funded by public and private donations

without expenditure of federal appropriations. The 1926 Enabling Legislation for establishment of the Park provides a simple statement that the land is set aside for a public park for the "benefit and enjoyment of the people." The purpose of the Park was previously defined by the 1924 Southern Appalachian National Park Commission Report, which set the stage for the enabling legislation and provided six criteria for a park to be located in southern Appalachia, as follows:

1. mountain scenery with inspiring perspectives and delightful details

2. areas sufficiently extensive and adaptable so that, annually, millions of visitors might enjoy the benefits of outdoor life and communion with nature without the confusion of overcrowding

3. a substantial part to contain forests, shrubs, and flowers, and mountain streams, with picturesque cascades and waterfalls overhung with foliage, all untouched by human hands

4. abundant springs and streams available for camps and fishing

5. opportunities for protecting and developing the wildlife of the area, and the whole to be a natural museum, preserving outstanding features of the southern Appalachians as they appeared in the early pioneer days

6. accessibility by rail and road

1.2.2.3 National Environmental Policy Act (NEPA)

The National Environmental Policy Act of 1969 was one of the first laws ever written to establish a broad national framework for protecting the environment. NEPA's overall goal is to ensure that the federal government gives proper consideration to environmental, as well as economic and technical factors, prior to undertaking any major federal action that could significantly affect the environment.

Environmental Assessments (EAs) and Environmental Impact Statements (EISs) are required documents that assess the likelihood of impacts from alternative courses of action (USEPA 2003). NEPA directs all federal agencies to utilize a systematic, interdisciplinary approach that employs natural and social sciences and the environmental design art in planning and decision- making that may have an impact on the human and natural environment. Environmental impacts analyzed should include potential direct, indirect and cumulative effects that could result from implementation of proposed project alternatives. The report should contain a detailed statement by the responsible official that includes:

- The environmental impact of the proposed action
- Any unavoidable adverse environmental effects should the proposal be implemented
- Alternatives to the proposed action

- The relationship between local short- term uses of the human environment and the maintenance and enhancement of long- term productivity
- Any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

1.2.2.4 National Historic Preservation Act of 1966, as amended (NHPA)

Sections 106 and 110 of the NHPA

Section 106 of the NHPA requires federal agencies to review all actions (undertakings) that may affect a property listed or eligible for listing on the National Register and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on such actions. An undertaking can be direct, such as the construction of a new facility by the federal agency, or indirect, such as authorization provided to others by permits or other actions. 36 CFR 800 spells out the implementation process that federal agencies are to follow.

The National Register is maintained by the NPS and includes buildings, structures, objects, sites, districts and archeological resources. The Elkmont Historic District is listed on the National Register because of its state and local significance. To be considered potentially eligible for listing, a resource is often at least 50 years old. Section 106 and 110 also require that federal agencies enter into a scoping and consultation process. It specifically requires consultation with the SHPO, applicable Tribal Historic Preservation Officers (THPO), and other interested parties (Consulting Parties), including the general public, in the early stages of project planning (ACHP 1999a, 1999b, 1999c, 1999d and 1999e).

The goal of the consultation process is to identify historic properties, to assess project effects, and to seek ways to avoid, minimize or mitigate any adverse effects on the historic properties. Historic properties include a variety of significant cultural resources including archeological sites, buildings and structures, and traditional cultural properties. Under certain circumstances, the Advisory Council on Historic Preservation may enter into the consultation process.

Section 110 of the NHPA charges each federal agency with the positive responsibility for considering projects and programs that further the purposes of the NHPA, and it states that the costs of preservation activities are eligible for federal funding in all actions carried out or assisted by a federal agency. The 1992 amendments to the Act further strengthened the provisions of Section 110. Under the law, the head of each federal agency must assume responsibility for preservation of historic properties owned or controlled by the agency and ensure that the agency:

- establishes a preservation program for the identification, evaluation, nomination to the National Register, and protection of historic properties;
- consults with the Secretary of the Interior, acting through the Director of the NPS, in establishing its preservation programs;
- uses historic properties available to it in carrying out its responsibilities to the maximum extent feasible (FAPAP 1998).

1.2.2.5 Regulations of the Council on Environmental Quality (CEQ)
In 1978, the Council on Environmental Quality (CEQ) issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR §§ 1500 - 1508). These regulations are designed to assist federal agencies in effectively implementing environmental policy and "action forcing" provisions of the National Environmental Policy Act (NEPA).

1.2.2.6 NPS Director's Orders
NPS Director's Orders and 2001 *Management Policies* (NPS 2000) provide guidance regarding park and conservation planning, environmental impact analysis, decision-making and cultural resource management. NPS Director's Orders that have been consulted in this planning effort include:

- #2: *Park Planning*
- #6: *Interpretation and Education*
- #12: *Conservation Planning, Environmental Impact Analysis, and Decision- Making*
- #28: *Cultural Resource Management*
- #28B: *Archeology*
- #28C: *Draft Handbook for Oral History in the National Park Service*
- #42: *Accessibility for Visitors with Disabilities in National Park Service Programs and Services*
- *#48: Commercial Services*
- #77: *Natural Resource Management*
- #77- 1: *Wetland Protection*
- #77- 2: *Floodplain Management*
- #83: *Public Health*
- #87A: *Park Roads Standards*

A summary of the purpose and intent of each NPS Director's Order is provided in Appendix A.

1.2.3 Substituting NEPA for Section 106 Review

NHPA regulations allow an agency to use the NEPA process and the documents it produces to comply with Section 106 in lieu of the procedures set forth in Sections 800.3 through 800.6 (36 CFR 800). This method allows the process to be streamlined in terms of its overall environmental/historic preservation review process. To use this provision, the following criteria must be met:

1. The agency must notify the SHPO/THPO and the Advisory Council on Historic Preservation that it intends to substitute NEPA documentation for NHPA documents.

2. The agency must identify consulting parties - - such as Indian tribes and Native Hawaiian groups, local governments, preservation organizations - - in a manner consistent with Section 800.3(f).

3. The agency must identify historic properties and assess effects on them in a manner consistent with Sec. 800.4 through 800.5, but the scope and timing of identification

and effect determination may be "phased to reflect the Agency Official's consideration of project alternatives in the NEPA process" and the effort the agency expends must be "commensurate with the assessment of other environmental factors."

4. The agency must consult about the action's effects with the SHPO/THPO, tribes, Native Hawaiian groups, and other consulting parties during NEPA scoping, analysis, and documentation, and it must involve the public in accordance with the agency's NEPA procedures.

5. The agency must develop alternatives and mitigation measures in consultation with the other stakeholders, and describe these measures in its EA or Draft EIS.

Subsection 800.8(c)(2) of the NHPA also requires that the EIS be reviewed by the SHPO, THPO and other Consulting Parties, and Section 106 review was conducted during preparation of this document. Scoping, identification and assessment of effects on all resources, including cultural resources, has been undertaken as part of the analysis leading to the Draft EIS, with the results presented in this document. Consultation to resolve potential adverse effects is coordinated with public and agency comment on the Draft EIS and the results will be reported in the Final EIS. Subsection 800.8(c)(4) requires that the measures an agency will take to mitigate adverse effects on historic properties be specified in a Record of Decision that is written following the Final EIS. In addition, if a Memorandum of Agreement (MOA) between the Park and another agency is developed under Section 106, this MOA and final comments from the Advisory Council on Historic Preservation will be addressed in the Record of Decision. Unless there is some compelling reason to do otherwise, the Section 106 MOA will be fully executed before the Record of Decision is issued, and this record will provide for implementation of the MOA's terms.

1.2.4 Leases and Other Agreements

During the 1920s and 1930s, when the states of North Carolina and Tennessee began acquiring land for the Park, residents of these lands, including those in Elkmont, were offered the option of selling their properties outright or accepting a lesser payment in conjunction with a lifetime lease to the property. This lifetime lease option was not available until 1932, after many former residents had already sold their property to the Tennessee Park Commission.

By 1950, a desire to bring electric service to the remaining Elkmont lessees was hindered by the impending expiration of leases, so an agreement was negotiated in 1952 with the Secretary of the Interior under which lifetime leases were exchanged for a common expiration in 1972. The fixed leases gave the power company a 20- year amortization period with a stable customer pool, and electricity was provided to Elkmont. In 1972, the Elkmont Preservation Committee (EPC) was formed for the purpose of negotiating with the federal government for an extension of the leases. The EPC was successful in obtaining a 20- year extension of the leases to 1992.

In 1992, EPC attempted to secure another lease extension, but was unsuccessful. As a result, on December 31, 1992, when EPC's lease for use of the hotel and all but three of the cabins expired, the occupants were required to vacate the buildings. The remaining three cabins were not included under the EPC lease, but were occupied under individual leases, which expired upon either the lessee's death or on December 31, 2001.

In 2001, a new planning process was initiated and information gathered was documented as part of the preparation for an EA. Due to the complex nature of the issues within the District and the level of controversy surrounding potential project alternatives, the NPS elevated the EA process to an EIS process in 2003 to allow for further investigation of these issues. Through this EIS planning process, a decision will be made regarding how to manage the District. The majority of the buildings have been unoccupied for over 10 years. The Park is required to maintain buildings until a decision is made.

1.3 Consultation with State and Federal Historic Preservation Agencies

NPS has proposed three plans for management of the District. They were:

Plan #1
In September 1994, the Park notified the Tennessee Historical Commission, the office of the SHPO in Tennessee, of its intent to remove all of the buildings in the enclave and outlined plans to perform the mitigation actions required by the NHPA for removal of historic buildings. The SHPO objected to this plan due to the 1994 listing of many of the buildings on the National Register of Historic Places. The SHPO indicated that some buildings should be retained for use as interpretive displays to educate the public regarding the history of Elkmont.

Plan #2
In October 1996, the Park proposed a compromise calling for preservation of three buildings to be used to interpret the history of the District and removal of all other buildings. The SHPO also objected to this proposal, suggesting that the Park submit a three- party draft agreement (i.e. NPS/SHPO/Advisory Council on Historic Preservation) describing its preferred action of retaining three buildings and proposed mitigation for removal of the other buildings. The Park submitted a draft agreement in March 1997, but again the SHPO objected to this agreement because they did not feel that the proposed plan would address the need for adequate interpretive materials to educate the public about Elkmont's history and subsequently ended consultation with the NPS.

Plan #3
In 1998- 99, the Park, along with officials from NPS' Washington and Southeast Region offices, developed a second compromise that proposed preservation of 17 cabins and the Appalachian Clubhouse. At the same time, the NPS allocated a total of $160,000 to the Park over FY 98- 99 to be used to stabilize the Clubhouse and the 17 cabins. This proposal was sent to the Advisory Council on Historic Preservation and the SHPO in October 1999. The Advisory Council responded that the NPS proposal constituted a new action and required new consultation. The new action also initiated the NEPA process.

1.3.1 Historical Significance of the Site

The Elkmont Historic District was listed on the National Register of Historic Places on March 22, 1994, and contains two hotel buildings, a social clubhouse, and more than 70 dwellings and outbuildings (Thomason et al. 1993). Most of the resort community elements were developed between 1910 and 1925 during the height of lumbering operations in the town of Elkmont. The cabins along Little River in the Appalachian Club and three cabins in the Wonderland Club are the only buildings in the district that were constructed after the lumbering activities based out of Elkmont concluded and the railroad tracks were removed.

The first club that formed at Elkmont was the Appalachian Club (Figure 1- 2). This club was started by a group of Knoxville- based businessmen and sportsmen who purchased approximately 50 acres of land from the lumber company in 1910 located along the Little River and Jakes Creek. Today, this area includes the Appalachian Clubhouse and 60 cabins and outbuildings. For planning purposes, three areas within the Appalachian Club have been identified. These areas are referred to in this document as Daisy Town (the area closest to the Clubhouse), Society Hill (further south and along Jakes Creek), and Millionaire's Row (the area along the Little River trail located between the river and Bearwallow Branch). The original Appalachian Clubhouse was destroyed by fire in 1932 and was rebuilt in 1934 based on a design by Knoxville architect Albert Bauman, Jr. Exterior dormer windows have been removed and a newer metal roof has been added. Otherwise, it has been modified very little since that time.

In Daisy Town, there are 22 buildings, 16 of which are contributing resources. Three of these are built around "set- off" houses, referring to their origin as railroad worker's houses that were literally "set- off" from the railroad flat cars in the Elkmont logging village. Another unusual building is "Adamless Eden," a log playhouse for children dating to 1921. Levi Trentham was a long- time resident of the Elkmont area who sold land to the Little River Lumber Company. His log cabin was moved from what is now the campground to Daisy Town shortly after his death in 1932.

Cabins in the Society Hill area along Jakes Creek were built between 1910 and 1925. Of the 28 buildings, 18 are considered contributing resources. The Byers/Chapman cabin was given to Colonel David Chapman by the Tennessee Park Commission as an award for his central role in the establishment of the Park. Millionaire's Row, circa 1928 to 1940, was the last major area of construction. Residences there were built after the railroad left in 1926. The residences in Millionaire's Row are larger than most of the cabins in the Appalachian Club and several of them had car garages. Millionaire's Row has eight cabins, six of which are considered contributing resources. These include the Murphy cabin, which was associated with Joseph Murphy, the Superintendent of the Little River Railroad. One structure, the Miller cabin, was originally built as a horse stable, but was remodeled in 1950 to accommodate living quarters in the upstairs loft.

In ca. 1911, another group of businessmen bought land for the Wonderland Club. The Wonderland Club area is approximately one mile north of the Appalachian Club, east of the Little River and south of its confluence with Catron Branch. There are ten remaining cabins, the Wonderland Hotel, the Annex, and one woodshed remaining in the

Wonderland Club. The hotel was built in 1912 and, in 1928, a side extension and large rear wing were added. The Annex was built adjacent to the Wonderland Hotel in 1920. Both buildings are typical of the resort hotels built in this era in the southern Appalachians. Of the ten cabins in the Wonderland Club, six are contributing resources.

As noted above, the District was placed on the National Register because it represents, at the state level of significance, the only remaining collection of early 20th century resort cabins retaining integrity in the Appalachian Mountains of Tennessee. The period of historical significance is 1908 to 1940. These dates span from the beginning of recreation excursions to Elkmont to the date that the last resort cabin was built. Logging operations at Elkmont ended in 1925 and the automobile was becoming a popular mode of transportation towards the end of this period of historical significance.

According to the Tennessee Historical Commission, general criteria for evaluating significance (November 3, 1989) are buildings and man- made site features over 50 years of age that:

A. are associated with events that have made a significant contribution to the broad patterns of our history;
B. are associated with the lives of persons significant in our past;
C. embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose component may lack individual distinction (such as a district); or
D. have yielded, or may be likely to yield, information important in history or prehistory.

In addition, National Register Bulletin 16 (November 30, 1986, Rev. 1990) states:

> A contributing building, site, structure, or object adds to the historic architectural qualities, historic association, or archeological values for which a property is significant because a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period; or b) it independently meets the National Register criteria.
>
> A noncontributing building, site, structure, or object does not add to the historic architectural qualities, historic association, or archeological values for which a property is significant because: a) it was not present during the period of significance; b) due to alterations, disturbances, additions, or other changes it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period; or c) it does not independently meet the National Register criteria.

The historical significance of Elkmont, the Wonderland Hotel and the cabins is discussed in the National Register nomination prepared for the District. Section 8 of the nomination states:

> The District is significant under Criterion A (historical events) as the only remaining collection of early 20th century resort cabins retaining integrity in the Appalachian Mountains of Tennessee…Elkmont is significant under Criterion A in the area of entertainment/recreation. Elkmont was formed during the outdoor recreation movement of the early 20th century. This movement stressed a return to nature and resulted in the construction of hotels and mountain camps throughout America. The universal enthusiasm of Americans for the "back to nature movement" could be seen in the vast expansion of the national park and forest system under Presidents Theodore Roosevelt and William Howard Taft, the popularity of outdoor adventure stories, creation of the Boy Scouts in 1910 and the Campfire girls in 1912, and the vogue of bird watching and sportsman's clubs. In the Southern Appalachians, this renewed interest in outdoor life led to the construction of numerous hotels and mountain cottages.… Elkmont is probably unique in its permanent long- time association with individuals prominent in the business, professional, social, and civic life of East Tennessee (Thomason et al. 1993).
>
> Elkmont has both local and state significance. Not only is this resource unique in Sevier County, but no similar collection of early 20th century cabins and mountain hotels is known to exist in the Appalachian Mountains of East Tennessee. Other summer resort complexes in the vicinity such as Line Springs and Dupont Springs have been razed, while the resort cabins at Kinzel Springs in Blount County have been modified and no longer retain their historic integrity. The creation of GRSM [the Park] in the 1930s largely halted construction at Elkmont resulting in few changes to its pre- 1940 appearance.

The Wonderland Hotel was fairly typical for its time period. However, unlike other resort hotels on commercial rail line or roads, it was located deep within the mountains in an area accessible primarily by train up the Little River, or for the very hearty, by a primitive road over the mountain. The train that led to Elkmont was a logging train that was also used as an excursion train for tourists. As a result, the town became a popular tourist destination.

The collection of buildings and features at Elkmont is greater than any single building. As National Register Bulletin 15, "How to Apply the National Register Criteria for Evaluation" points out, a district can be eligible under Criterion C (design/construction) even if its "components may lack individual distinction". The National Register nomination states:

> The Wonderland Hotel and Elkmont cabins are architecturally significant because their forms and plans typify "rural building traditions in the Tennessee Mountains" (Thomason et al. 1993). The buildings illustrate both local craftsmanship and the use of locally available materials (i.e. river rock and locally milled lumber), as well as stock material brought from outside the area (such as windows, doors and hardware). The buildings also "reflect a simplicity of form and function" (Thomason et al. 1993). Porches tie the buildings directly to the surrounding natural landscape, as do the wood and stone building materials.

River rock also is used as a landscape feature in retaining walls, walkways, and planters.

While the existing District nomination was listed for "Entertainment and Recreation" and for "Architecture", other features of the cultural landscape visible today that retain historic integrity include stone walls, cemeteries, patios, planters, walkways and remnants of the vistas that were dominant during the period of significance. These landscape features are part of the District's character and will be accounted for in the NEPA process.

Although a complete archeological survey of the District has not been conducted, a phased investigative process conducted under the Archeological Resources Protection Act (ARPA), and under an approved Research Design in accordance with Section 106 of the NHPA and its implementing regulations, has been undertaken. Both prehistoric and historic archeological resources are present, some of which are considered significant. Archeological resources, while not the original reason for the District's nomination, are also taken into account when developing a management plan. The information they provide contributes to the understanding of the continuum of human occupation within this part of the Park.

Although the Elkmont Campground is located centrally within the District, it is not the focus of this environmental planning process. It was included in the District primarily because it was the site of the logging community of Elkmont and its inclusion also ties the two social clubs together into one geographically contiguous historic resource area.

1.3.2 Vision

The overall goal for this project is to develop a full range of management alternatives under NEPA, to compare potential impacts that would result from implementation of each of the alternatives, and to develop an achievable management plan that considers public comment in addition to agency regulations, policies and guidelines. The basis of the alternative development process was a series of goal statements for the District. The primary goal of this planning process identified through the public planning process is to *foster enjoyment, understanding, appreciation, and protection of natural and cultural resources both within Elkmont Historic District and Park- wide by:*

- creating opportunities for emotional and intellectual connections to these resources;
- protecting and perpetuating the significant and diverse natural resources and ecosystems (including forest communities and water resources) found within Elkmont Historic District, keeping them free from impairment; and
- protecting and perpetuating the tangible (archeological sites, and historic building and structures, landscapes and features) and intangible (feelings of attachment and family life, myth, folklore and ideology) aspects of the cultural resources that comprise the District.

1.3.3 Interpretive Themes and Goals

Resource education themes and goals for Elkmont were developed cooperatively with input from Park staff and the public. They were based on the Park's 2001 Comprehensive Resource Education Plan (NPS 2001a) and considered the history and contributions to the Park made by the District. The overall interpretative goal is to *provide visitors with an understanding of the significant cultural and natural resources within the District through educational programs/activities and media that interpret and discuss the following topics:*

- the history of a national park movement in the Great Smoky Mountains from the 1890s to 1934, including the issue of whether or not to designate the area as a National Park or National Forest, utilizing the stories of individuals such as Colonel David Chapman and James B. Wright, who held opposing viewpoints, but both owned Elkmont properties;
- the growth of a local and regional tourist resort industry (including the "Back to Nature" movement of the early 20th century), which helped fuel the Park idea, from the 1890s to the present;
- the logging industry's impact on the forest resources in the Smokies and, in particular, the significance of the Little River Lumber Company in the formation of the Elkmont community, Elkmont's evolution as a summer resort, and the establishment of the Park;
- the architectural styles of the Elkmont structures that predominantly made use of native materials and exemplify simplicity of form and function; and
- preservation of cultural resources in a park designated for its natural wonders, evident in Park management's integration of historic preservation with the continuation of natural processes.

Visitor education programs and services provided at Elkmont must also fall within the scope of the Park's major themes of diversity and abundance, refuge of scenic beauty, and a continuum of human activity.

1.4 Management Objectives

As stated in the 1982 Plan, the overall management objective for the Park is to "manage the Park in a manner consistent with the purpose of preservation, enjoyment and benefits to humankind through scientific study of its distinctive combination of natural and cultural resources" (NPS 1982). The 1982 Plan also includes management objectives prepared by the Park superintendent for each of the Park's resources. During the process of developing new management plan alternatives, management goals and objectives specific to various resources at Elkmont were refined to reflect current management direction. The sections below provide both broad and specific management direction for resources within the District.

1.4.1 Cultural Resources

In general, management objectives for cultural resource preservation at the Park include five goals (NPS 1982):

- Identify, evaluate, protect and preserve the Park's cultural resources in a manner consistent with legislative and executive requirements and NPS historic preservation policies.
- Reduce, to the degree possible, deterioration of historic structures that are determined, through objective evaluation, to merit long- term preservation for interpretive or other purposes.
- Preserve historic structures associated with pioneer life, such as log residences, churches, schools, and barns.
- Reduce and, as possible, eliminate the modern developments known to adversely affect archeological resources of the Oconaluftee- Deep Creek area and those not necessary to the direct support of essential Park programs.
- Ensure that cultural resources and settings are maintained in a manner compatible with natural resource management objectives.

As part of the overall development of project goals and objectives, more specific cultural resource goals and management objectives were developed for the District by the Park with input from the public. Consistent with NPS policy, the proposed goals and objectives for cultural resources of the District include:

- Take into account the total context of impacts to the cultural resources present, extant (above) and below ground, and avoid or minimize these impacts if possible.
- Maximize opportunities for adaptive reuse of resources at the Wonderland Club and Appalachian Club areas as a means of meeting identified Park administrative and visitor use needs.
- Ensure that the selected alternative retains buildings, structures and component landscapes in clusters and associations sufficient to provide a sense of character of the District.
- Foster opportunities for thematic interpretation of the history and significance of the District and its contribution to the history of the Park.

Specific management objectives state that any historic resources selected for preservation should serve an agency need and should be adequately maintained. Besides the avoidance or minimization of impacts to buildings and structures, any human remains or funerary objects or objects of cultural heritage are to be treated in accordance with the provisions of the Native American Graves Protection and Repatriation Act and any other applicable laws and regulations. Any traditional cultural property located within the District is also to be protected. Traditional cultural properties are most often, but not necessarily, associated with Native American cultures. They are ethnographic resources that, for at least two generations, are associated with cultural practices or the beliefs of a living community that are rooted in that community's history or are important in maintaining its cultural identity (NPS 1998a). To date, no traditional cultural properties have been identified within the District.

1.4.2 Natural Resources

Management actions must be consistent with legislative and executive mandates as well as NPS policies. To accomplish these goals, the 1982 Plan (NPS 1982) incorporates the following components when implementing resource management strategies:

- Protect and perpetuate the significant and diverse natural resources and ecosystems (including forest communities and water resources) found within the District, keeping them as free as possible from the adverse influences of human intrusion.
- Protect and, where possible, restore the natural processes as they would proceed if they had never been influenced by non- Indian society.
- Ensure adequate protection for threatened or endangered species; critical habitat; and unusual or particularly vulnerable natural resources of the Park, such as virgin forest, brook trout habitat, beech gaps and outstanding cove hardwood stands.
- Minimize, to the extent possible, the adverse impact of exotic plants (e.g., mimosa, kudzu, Japanese honeysuckle, tree- of- heaven, and princess tree) and animals (e.g., European wild boar, rainbow and brown trout) on the Park's natural resources and processes.
- Manage the Park as a core unit of the Great Smoky Mountains International Biosphere Reserve.

The NPS has also identified additional management goals relevant to management of the District. These include:

- Protect streams, seeps, wetlands and floodplains.
- Provide water resource management methods consistent with responsibilities outlined for Outstanding National Resource Waters.
- Protect federally- listed threatened and endangered species and their habitats.
- Protect Montane Alluvial Forest and its ability to regenerate.
- Avoid loss of habitat for the synchronous firefly population.
- Ensure that visitor use levels are maintained within the level that natural resources have the ability to sustain.
- Minimize areas of disturbance and maximize the use of previously disturbed areas.

1.4.3 Visitor Use and Experience

Guiding principles for visitor use and experience are to promote visitor activities at appropriate locations, levels, and times that minimize adverse impacts on Park resources, while achieving educational goals and ensuring that visitor access to adjacent use areas is adequately maintained (i.e. trails).

The primary goal for visitor use and recreation is to foster enjoyment, understanding, appreciation and protection of natural and cultural resources within Elkmont and throughout the Park by creating emotional and intellectual connections to these resources. The following objectives will aid in achieving that goal:

- Ensure that "traditional" recreational opportunities currently enjoyed by the public are adequately provided for (including support facilities).

- Ensure that visitor education programs and services fall within the scope of the Park's major themes of biodiversity, scenic beauty and a continuum of human activity.
- Recognize the opportunities for Elkmont's cultural resources to aid in interpretation of the Park's origins.
- Identify, design and implement educational activities and media that interpret the unique cultural resources found at Elkmont.
- Provide visitors with an understanding of the significance of Elkmont's cultural resources.

1.4.4 Interpretation

Interpretation in the Park involves conveying natural, cultural and historical information to the public in such a way as to incorporate discussion of the values of various resources. Management objectives for interpretation include the following (NPS 1982):

- Demonstrate by our own actions our concern for Park resources and the environment beyond Park boundaries and show that low- impact activities can be practical and pleasant.
- Make all resource information available in forms that benefit and provide enjoyment for each of the primary visitors to the Park: scientist, historian, drive- through visitor, interested amateur "specialist," employee and neighbor.
- Adequately inform visitors and potential visitors of the opportunities and limitations presented by the Park in advance of, as well as during, visits and the means of using the Park safely and responsibly.
- Convey to visitors, neighbors and the nation, a sense of the tangible and intangible values associated with the great diversity of the Park's living organisms, the unique combination of extent and accessibility of its wilderness sanctuary and the extraordinary remnants of Native American and pioneer culture found within it.

1.4.5 Partnerships

NPS policy states that the agency may seek opportunities to enhance natural resource management within the Parks and outside its administrative limits by working cooperatively with other public agencies, Native American tribes and private landowners. Preservation of ecosystems may be more effective when the NPS works with other parties that have similar objectives. The NPS will also pursue partnerships with other agencies and groups to minimize the impacts of land management practices and other activities initiated outside Park borders. Some external threats to Park resources include noise, artificial lighting, contamination of water, unsustainable allocation of water resources, air pollutants, wetland destruction and degradation, adverse impacts on visual quality resources, damage to endangered and threatened species' habitats and infiltration of invasive species (NPS 2000). Currently, no partnerships have been identified as being integral to any of the proposed alternative management options for Elkmont Historic District.

1.5 Summary of Alternative Development Issues

The NPS planning team, with input from Park staff, the public and Consulting Parties, identified a number of issues in regard to future management of the District. The primary concerns were related to cultural resources, natural resources and visitor experience. The plan chosen for the District will provide guidelines for addressing specific issues, while conforming to the Park's mission, the vision for Elkmont and any laws or regulations that apply to Park planning procedures. This plan should also aid the Park in meeting its stated objectives for each resource category.

1.6 Derivation of Impact Topics

Impact topics are those special resources or management policies that have a bearing on the selection of an alternative for the District. The impact topics relevant to the Elkmont alternatives analysis are based on laws, policies and regulations, and comments made by the public during the scoping process.

Impacts may be direct (at the same time and place as the proposed action) and/or indirect (occur later in time or farther in distance than the action), and must be examined together for their cumulative effect (the incremental environmental impact of the action, together with impacts of past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions). Further, impacts have to be assessed in terms of sustainability and long- term management. This means that the impact analysis must examine the relationship between the short- term implementation of an alternative and the long- term productivity of the resources within the District. It must also identify any irreversible or irretrievable (permanent) commitment of resources and any adverse impacts that could not be avoided. The information gathered for the EIS must be sufficient to:

1. assess the environmental, historic, economic and social values that will be affected, either beneficially or adversely, by the proposed actions and alternatives; and,
2. demonstrate compliance with related environmental requirements; and
3. allow for selection of an alternative that will consider the importance of all resources and balance these considerations with the potential for resource impacts associated with each alternative.

The list of issues brought forth for analysis in this Draft EIS includes:

- cultural resources
- wetlands
- floodplains
- water quality
- air quality
- biological resources
- terrestrial habitats and forest communities
- aquatic habitats
- endangered and threatened species
- fish and wildlife

- geology and soils
- transportation and access
- visitor use and experience
- noise
- aesthetics and viewshed
- land use –existing and historic
- social and cultural patterns
- impacts to the General Management Plan
- economics
- appropriate and necessary (NPS policy and mission)

The following section provides a discussion of the impact topics identified during project scoping as appropriate for analysis in each of the proposed management alternatives for the District.

1.6.1 Cultural Resources

There are many types of resources classified as cultural resources and they are usually recognized as districts, sites, buildings, structures, and objects. Generally, cultural resources reflect the imprint of human occupation on the environment. They may be above ground, such as buildings and structures, or below ground, such as archeological resources. Cultural resources also include the cultural landscape, which illustrates how people used the area and shaped it to fit their liking. Cultural landscape features include foot trails, road networks, plantings, fountains, vistas and other manipulations of the landscape. Traditional cultural properties are also protected cultural resources and, while they may not be exemplified in a building or structure, they are considered places of reverence or importance to cultural traditions. More discussion of how the NPS views these cultural resources is provided in the *Cultural Resource Management Guideline* (NPS 1998a).

1.6.2 Natural Resources

Many components of the natural environment at Elkmont are covered by laws and policies consistent with guidance and the decision- making process provided for in NEPA. Those laws or orders relevant to planning for the District are the Endangered Species Act and Executive Orders 11988 and 11990 concerned with Floodplain Management and Wetland Protection, respectively. The NEPA process can incorporate the consultation requirement of Section 7 of the Endangered Species Act. The executive orders concerning floodplains and wetlands direct the NPS to avoid, to the extent possible, both long- and short- term impacts to those resources. Both wetlands and floodplains are important resource components of the District. Wetlands and floodplains are also under the jurisdiction of the U.S. Army Corps of Engineers, the agency responsible for implementing the regulatory process provided for by Section 404 of the Clean Water Act.

Other guidance, policy and regulations that deal with natural resource protection, including impacts to air and water quality, changes in noise levels, impacts to aquatic habitat and fisheries, terrestrial resources including forest communities, wildlife, and the presence of invasive plant or animal species have also been considered. Geology and

soils are also impact topics since certain activities are dependent on the geology and the ability of the soils to accommodate or withstand particular land uses.

1.6.3 Interpretation and Visitor Use

Interpretation and visitor use are topics key to the development of a General Management Plan Amendment that addresses the future of Elkmont. Interpretation is consistent with one of the purposes of the Park, "to preserve its exceptionally diverse natural and cultural resources and to provide for public benefit from and enjoyment of those resources in ways that will leave them basically unaltered by modern human influences" (NPS 2001a). Three themes form the basis of the Park's *Comprehensive Resource Education Plan*: diversity and abundance, a continuum of human activity, and a refuge of scenic beauty (NPS 2001a). Given its abundance of natural resources and its cultural legacy, Elkmont provides a place within the Park that these themes can be interpreted for the public. Specifically, the District provides opportunities to view remnants of historic land uses of the region representative of the logging, railroad and vacation community prior to establishment of the National Park.

- During the initial steps in developing a plan for the District, project goals and objectives were developed. These goals and objectives were presented to the public as part of the scoping process. Final project goals and objectives considered the public comments received and are consistent with those identified in the Park's *Comprehensive Resource Education Plan*.

Goals and objectives identified specifically for the District include:

- ensure that visitor education programs and services fall within the scope of the Park's major themes of diversity and abundance, refuge of scenic beauty and a continuum of human activity;

- ensure that the traditional recreational activities of hiking, camping and fishing continue to be adequately provided for, including the necessary support facilities;

- ensure that actions/alternatives retain buildings, structures and component landscapes in clusters and associations sufficient to provide a sense of character of the District and foster opportunities for thematic interpretation of the history and significance of the District and its contribution to the history of the Park.

Guiding principles were developed by the NPS that address visitor activities and access to the District. The guiding principles for visitor use were designed to:

- promote visitor activities at appropriate locations, levels and times that minimize the adverse impacts on Park resources and achieve educational goals identified in applicable current management documents; and

- ensure that visitor access to adjacent use areas are adequately maintained (i.e., trails).

To summarize, planning for the interpretation and visitor use at Elkmont is founded on NPS laws, management policies, and the Park's *Comprehensive Resource Education Plan*, as well as intensive public input and comment solicited during the scoping and project planning phases.

1.6.4 Socioeconomic Environment

The Park serves many socioeconomic functions from international to local economies. Besides being designated as an International Biosphere Reserve in 1976 and a World Heritage Site in 1983, it also serves as a popular recreational destination. It has earned the distinction of being one of the most highly visited National Parks in the country with annual visitation between 9 and 10 million for much of the last decade (NPS 2004b). In the past ten years, two percent of the Park's visitors were of international origin. Because it is a major attraction for visitors from all over the world, the Park has been the source of economic stimulus for development of western North Carolina and East Tennessee. Seventeen percent of the visitors originated from Tennessee (Littlejohn 1997).
Located in both Tennessee and North Carolina, the Park is easily accessible from many of the major population centers of the eastern United States. The gateway communities of Gatlinburg, Cosby, Cherokee and Townsend have traditionally provided lodging and dining facilities to Park visitors. Besides backcountry and campground overnight facilities, including the remote Le Conte Lodge, no commercial overnight lodging is available in the Park.

During the alternatives development process, some of the public expressed a desire to reuse cabins and other buildings for overnight lodging and dining. If implemented as part of an alternative, this visitor use would have to be provided under a concession's contract, and thus would also be subject to scrutiny under the policies and procedures that govern park concessions, as described later in this document.

Besides examining overnight lodging as an alternative component in accordance with NPS concession law and policies, the potential impacts to the gateway communities, as well as the impact upon the resources found within the District, were examined. Elkmont is easily accessible to Park visitors. It is located near the Sugarlands Visitor Center, Gatlinburg and Townsend. A 1996 visitor use study found that 43 percent of summer visitors and 41 percent of all fall visitors obtained access to the Park through the Gatlinburg entrance. Given the proximity of the Elkmont area to the Gatlinburg entrance and Sugarlands Visitor Center, a substantial number of visitors, particularly those staying for less than a full day, could use trails and/or trailheads that originate at Elkmont, as well as any other recreational, interpretive or other visitor facilities or uses that could be included in the management plan.

1.6.5 Necessary and Appropriate

Certain uses of the District must be necessary and appropriate, meeting criteria provided by NPS concession law. This body of law provides that the Director of the NPS can solicit and enter into contracts to provide visitor services. The primary legislation controlling the necessary and appropriate determination is found in Title IV of the National Parks Omnibus Management Act of 1998 (Public Law 105- 391). In this law, visitor services are defined as accommodations, facilities and services determined to be

necessary and appropriate for the public use and enjoyment of a park area. These services are provided for under contract to the NPS by a concessioner who charges a fee to the user. Examples of visitor services are lodging, campgrounds, food service, merchandising, tours, recreational activities, guiding, transportation and equipment rental, sale of interpretive materials, and the provision of interpretive programs.

The policy of Congress and the Secretary of the Interior provides the basis of concession contracts in the law (36 CFR Ch. 1 Subsection 51.2). Visitor services can only be provided under safeguards so that they will not "unduly impair park values and resources" and are "limited to locations that are consistent to the highest practicable degree with the preservation and conservation of the resources and values of the park." Visitor services must also be deemed "necessary and appropriate for the public use and enjoyment of the park in which they are located."

NPS *Management Policies* (NPS 2000) dealing with commercial visitor services provides further guidance on this matter. Even though the Park does not have a Commercial Services Plan, other planning potentially involving visitor services must follow the same criteria. Concessions have to support the "park's purpose and significance, exceptional resource values, and visitor experience objectives," and must "be consistent with the Park's enabling legislation." Besides being economically feasible, the following criteria (NPS 2001) must be met for each concession.

The concession must:

- be appropriate and necessary for the public use and enjoyment of the park, and the need for the use cannot be met outside park boundaries;
- further the protection, conservation and preservation of the environment, and park resources and values;
- be based on sustainable principles and practices in its planning, design, siting, construction, utility systems, selection and recycling of building materials, and waste management; and
- enhance visitor use and enjoyment of the park without causing unacceptable impacts to park resources or values.

Historically, the 1916 Organic Act mandated that the NPS conserve its park resources, both natural and cultural, "unimpaired" for the enjoyment of future generations. When the initial portion of the land that currently comprises Great Smoky Mountains National Park was donated by the states of North Carolina and Tennessee in 1930, the presentation of the deeds for this land stated that the Park, when established, "will create, in the heart of the Appalachian Mountains, a permanent sanctuary for animal and bird life and a botanical garden and arboretum which scientists say will be unequaled in the world" (NPS 2001a). Most recently, the Park's 1998 5- Year Strategic Plan mission statement further refined the purpose of the Park as preserving its exceptionally diverse natural and cultural resources and providing for public benefit from and enjoyment of those resources in ways that will leave them basically unaltered by modern human influences (NPS 2001a).

Two of the project alternatives presented in this document propose visitor services in the form of lodging, dining and related facilities operated by a concessioner. The NPS *Management Policies* mandate that overnight accommodations and food services be restricted to the kinds and levels necessary and appropriate to achieve Park purposes. In general, they should be provided only when they cannot adequately be provided in the vicinity of the Park. They may be justified when the distance and travel time to accommodations and services outside the Park are too great to permit reasonable use, or when leaving the Park to obtain incidental services would substantially detract from the quality of the visitor experience (NPS 2000).

1.6.6 NPS Operations

The current operations within the Park, and specifically at Elkmont, include law enforcement, operation and maintenance of the campground, operation of the existing wastewater treatment plant and the existing water supply system, maintenance of existing roads and trails, removal of exotic invasive vegetation, treatment of hemlocks to fight the woolly adelgid infestation, stabilization of the historic buildings and visitor education activities. The effect that any of the proposed alternatives will have on current operations within Elkmont and those that may have an impact Park- wide are discussed in the Environmental Consequences section of this document (Chapter 4).

1.6.7 Agency Consultation

A variety of agencies were contacted and consulted during this planning process. In addition to coordination with NPS staff, agencies contacted for information regarding threatened and endangered resources, species occurrences, habitat requirements and characteristics, and vegetation communities included:

- U.S. Fish and Wildlife Service
  (threatened and endangered resources)
- Tennessee Department of Environment and Conservation
  (water quality, wastewater and permitting issues)
- USDA Natural Resources Conservation Service
  (soils mapping)
- Tennessee Natural Heritage Program
  (threatened and endangered resources, vegetation community data)

Agencies contacted regarding cultural and archaeological resources included:

- Tennessee Historical Commission (SHPO)
- Tennessee Division of Archaeology
- Eastern Band of Cherokee Indians (EBCI) Tribal Historic Preservation Office

In addition, representatives from the Tennessee Historical Commission, the Tennessee Division of Archeology and the Advisory Council on Historic Preservation served as Consulting Party members at the request of the NPS. Tribal Historic Preservation Officers from the Chickasaw Nation and Eastern Band of Cherokee Indians have been involved through written and verbal communication.

1.7 Other Planning Actions

A number of projects, primarily with a transportation focus, are planned or proposed in the area as well. These actions are considered in the cumulative impacts analysis (Chapter 4) because of their connection in allowing visitors access to the Park or their potential to affect resources within the Park. Brief descriptions of these projects follow:

U.S. 441/Newfound Gap Road Improvements
The Federal Highway Administration has planned to implement proposed improvements to a section of Route 441 /Newfound Gap Road from the Park entrance south of the Oconaluftee Visitor Center near Cherokee, North Carolina, continuing into Park lands (NPS 2003b). The planning process is in progress with construction expected to take place over the next three to four years. The project includes repaving all 17 miles of Newfound Gap Road (U.S. 441) between the Park's boundary with Cherokee, North Carolina, and the Tennessee state line at Newfound Gap. Phase I of the project is limited to repaving and reconstruction within the existing road corridor along the 10.5- mile stretch of road from just north of the Collins Creek Picnic Area to Newfound Gap. However, the proposed work for Phase II may include more extensive construction outside the existing right- of- way to realign six intersections for improved safety along the 6.5 miles of the road from Collins Creek Picnic Area to the Park boundary at Cherokee (NPS 2004c).

U.S. 19/441 Bridge Project
Construction of a new four- lane bridge across the Oconaluftee River in Cherokee, North Carolina, is planned to replace the existing three- lane structure along Route 19/441. The proposed work consists of constructing a new four- lane bridge next to the existing bridge, then removing the old bridge (NPS 2003b).

U.S. 19 Improvements
The Eastern Band of Cherokee Indians is in the process of implementing proposed enhancements to a segment of Route 19 from Cherokee to Maggie Valley, North Carolina. The project is separated into seven phases, A through G. Some phases have been funded and are in progress, while other phases are not yet scheduled for construction due to lack of confirmed funding sources (NPS 2003b).

Cades Cove
An EIS process is proceeding to assess reasonable alternatives for addressing problems with traffic congestion at Cades Cove, a historic district that includes cultural resources representing the period from the 1800s to the early 1900s when European settlers developed the area as an agricultural community. Visitors often need two to three hours to complete the one- way loop road. During peak visitation, completing the loop may require four to six hours. Other concerns relate to the lack of adequate facilities for the number of visitors that currently travel to the area, protecting cultural resources from overuse, and continuing to provide a quality visitor experience (NPS 2004d).

Foothills Parkway Construction

The Foothills Parkway is a scenic roadway near the northern boundary of the Park. When finished, the road is planned to span 72 miles from Chilhowee, just west of the Park boundary, to the junction with Interstate 40, just north of the Park boundary, in Cherokee National Forest. Several segments of the road have been completed, but others are being evaluated and have not yet secured funding. One section includes the proposed construction of eight bridges over the next ten years (NPS 2003b).

North Shore Road

An EIS process is proceeding to assess reasonable alternatives that would resolve a 1943 agreement that obligates the Department of the Interior to build a road to replace North Carolina State 288, a road which existed in an area that was flooded when the Fontana Dam was built. The agreement asserted that the new road would be built through the Park along the north shore of Fontana Lake. In the 1960s, approximately seven miles of the proposed 30- mile road were completed before construction was stopped due to funding and environmental concerns. A variety of non- build and build alternatives are now being considered as possible ways to resolve the long- standing controversy concerning completion of the road (NPS 2004e).

Other Actions

Other actions taking place in Sevier County include widening of U.S. 321 in Gatlinburg; milling and paving operations along U.S. 441 (SR71) in Pigeon Forge, approximately five miles north of the Park; and road maintenance along West Foothills Parkway (from Look Rock to Rt.129), approximately one mile west of the Park. In addition to human actions, there are some natural occurrences that affect area resources as well. One natural event that has impacted the area is heavy rains in 2003 that caused severe damage along Parsons Branch Road from Cades Cove to U.S. 129.

2.0 ALTERNATIVES, INCLUDING THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

2.1 Alternatives Development

Alternatives development for the Elkmont EIS has been based on the project goals and objectives, an assessment of Park needs and public input. The alternatives presented in this EIS are intended to represent a full range of possible actions designed to address the purpose and need for the project. During the scoping phase, public involvement was facilitated by the Park. Input was also strongly encouraged from within the NPS and from the Consulting Parties, who represent long- standing stakeholders in the issues surrounding Elkmont. The primary issues brought forth during scoping centered on the preservation of buildings and restoration of natural communities. The alternatives presented in this chapter have taken these issues into consideration, as well as all other uses considered and dismissed during project scoping.

Project goals and objectives were developed based on protection of cultural and natural resources, and on providing visitor opportunities. Concurrent with development of project goals and objectives, potential uses for the District were considered. Park needs were examined to determine if the Park's proposed uses were compatible with the project goals and objectives, as well as the constraints and opportunities presented by District's terrain (such as inability to expand roadways adjacent to the Little River), its natural and cultural resources, and location within the Park. The resulting potential uses for the District, as defined by the Park, were then considered along with uses identified by the public and the Consulting Parties.

Seven detailed alternatives were developed to provide a full range of management options for the District. These alternatives include the No Action Alternative, as required by NEPA, a second alternative that follows the 1982 General Management Plan, but adds active natural resource management to remove non- native species and to promote forest restoration, and five alternatives that propose varying degrees of increased preservation of historic buildings within the District for a variety of purposes. All seven project alternatives are described in Section 2.2 of this chapter and were presented at public information meetings held on March 8, 2004 in Gatlinburg and on March 9, 2004 in Knoxville, Tennessee. In addition to input from the Park, public and Consulting Parties, several other factors were considered in development of the alternatives, as discussed below.

2.1.1 Public Involvement

Development of alternatives for Elkmont incorporated extensive public involvement opportunities. Table 2- 1 provides a chronology of the events leading to the proposed project alternatives that are the subject of this document. As part of the NEPA process, all issues identified by the public were recorded and considered by the Elkmont planning team. The detailed project alternatives resulted from development of goals, study of potential uses, and formulation and review of conceptual alternatives.

Table 2- 1: Chronology of Elkmont Public Involvement and Alternatives Development

Date	Event	Purpose	Topics Discussed / Result
4/23/2002	Internal Scoping	obtain park staff input	Information gathered on how visitor experience at Elkmont could address the Park's *Comprehensive Resource Education Plan*, the significance of the District's natural resources, and the logging history prior to establishment of the vacation community.
4/25/2002	Focus Group Meeting (Focus group subsequently became "Consulting Parties")	obtain input from stakeholders	NPS invited Focus Group members to be Consulting Parties, including: • Advisory Council on Historic Preservation (ACHP) • National Parks Conservation Association (NPCA) • Tennessee Historical Commission (TN SHPO) • National Trust for Historic Preservation • Sierra Club • Smoky Mountains Hiking Club • Elkmont Preservation Committee • Eastern Band of the Cherokee Indians • The Chickasaw Nation The Consulting Parties stressed the need for a strong public participation process and integration of the requirements of NEPA and NHPA.
5/1 /2002 and 5/2/2002	1st Set of Public Scoping Meetings	re- introduce Elkmont project to public	An overview of the NEPA planning process was presented. The public was surveyed to obtain their input on what was important, to understand what activities at Elkmont were most enjoyed, and to obtain viewpoints on how Elkmont should be managed. The survey form was also available at Sugarlands Visitor Center and at stations within the District. 554 responses were received and used to develop draft project goals.
7/18/2002 and 7/19/2002	Park Design Charette	development of potential uses for the District	Potential administrative uses, visitor education activities, and visitor services were examined. Ideas for visitor services came from the first public scoping meetings and survey form responses. Three potential uses were immediately eliminated (a fire fighting facility and North District Ranger Station were eliminated due to District's location with respect to needs within the Park and the need for separation from public uses; hostel use was eliminated since it is inconsistent with historic uses of Elkmont.
8/19/2002 and 8/22/2002	2nd Set of Public Scoping Meetings	input on draft goals and objectives; presentation of baseline studies	An overview presentation of baseline information was provided and then followed by facilitated group sessions on project goals, objectives and potential uses. Input from these public meetings was used to create conceptual alternatives.
9/28/2002	Public Workshop on Conceptual Alternatives	input on conceptual alternatives; record privately- held historical information and photographs	Workshop attendees rejected the four conceptual alternatives presented for discussion and were given an opportunity to modify them. Most attendees represented former cabin owners who wanted to save as many buildings as possible, minimize administrative uses, and maximize possible cabin rental and reuse of the Wonderland Hotel. Privately- held historical photos of Elkmont were recorded.

Table 2- 1: (continued)

Date	Event	Purpose	Topics Discussed / Result
10/8/2002	2nd Consulting Parties meeting	review of previous public meetings	Consulting Parties were briefed on the second set of public scoping meetings and the public workshop. The need to present a full range of alternatives was highlighted, including a No Action Alternative and one that emphasized visitor services. The mathematical approach to alternative development was abandoned.
1/14/2003	3rd Consulting Parties meeting	review of conceptual alternatives	Six foundation statements and the resulting conceptual alternatives based on public comment were reviewed. Consulting Parties made suggestions concerning the No Action Alternative and provided direction on alternative analysis to include natural and cultural resource impacts, the area of potential effect and the need to identify potential impacts to archeological resources.
2/1/2003	3rd Set of Public Scoping Meetings	present six conceptual alternatives for public comment	Over 180 persons attended the meeting. Their viewpoints were divided, with most supporting either the No Action or a maximum visitor services approach. Those few supporting the mid- range alternatives suggested incorporation of more protection of natural resources, cost reductions or increases in the number of buildings rehabilitated for public overnight use.
Winter-Spring 2003	NPS elevates NEPA process to EIS level.		Additional natural and cultural resource studies undertaken. NPS determines that Wonderland Hotel could not be restored and would have to be reconstructed. The Park seeks funding for new stabilization measures to prevent further building deterioration.
8/20/2003	4th Consulting Parties meeting	provide an update on project status	Wonderland Hotel, if utilized, would be reconstructed under *The Secretary of the Interior's Standards for the Treatment of Historic Properties; with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings*.
Fall 2003-Spring 2004			Additional natural and cultural resource field investigations were completed. Seven detailed draft alternatives were developed.
3/8/2004 and 3/9/2004	4th Set of Public Scoping Meetings	first scoping meeting as part of EIS process	Results of additional baseline studies and seven detailed alternatives presented with 30- day comment period. Comments received indicated a range of preferences from removal of all historic buildings to complete restoration and rehabilitation, including reconstruction of the Wonderland Hotel for public lodging. Comments received focused on funding, potential loss of cultural resources, potential impacts to natural resources, concerns with water quality in Little River, NPS requirements for "Necessary and Appropriate" analysis, traffic congestion, and use of buildings.
4/6/04	5th Consulting Parties meeting	provide an update on the alternatives and discuss comments from the March public meeting	The results of the additional baseline studies and the seven draft alternatives were reviewed, as well as the comments made at the public information meeting and received from the general public as of that date. The maximum area of potential effect for cultural resource considerations was discussed.

Parties contributing to this process included Park and NPS technical and management staff, the general public, and the Consulting Parties. A number of uses were considered as potentially appropriate for the District. Each potential use was subjected to the following examination:

- Which NPS or legislative mission/mandates/policies does it meet and which does it violate?
- How does it meet the District's goals, objectives, and mandates for visitor education? …for natural resources? ….for cultural resources?
- Is the use politically neutral?
- Does the Park have the authority to implement the use? If so, what authority?
- Who are the users?
- How many users will there be?
- What is the frequency of use?
- Is there a socio- economic impact (positive or negative) to the Park's gateway communities?
- How does the use fit with the current use of the District? …How does it conflict?
- Are there other suitable places for this use? If so, where?
- Are there partnership opportunities? If so, with whom?
- Has capital funding been identified?
- What are the potential funding sources?
- What are the operational impacts?
- Is the proposed use economically viable? Would federal or other funding be required?
- Could the use be supported by existing infrastructure or not? If not, what additional infrastructure would be needed?
- What are the traffic/transportation/people circulation impacts?
- Which buildings could be adapted for this use?
- What ADA accessibility needs would be required in the design of the use?
- Is the implementation of the use short- term or long- term?

Following a design charrette in July 2002, the proposed uses remaining under consideration included the following:

Park administrative uses:

- curatorial facility for archival storage and research purposes for the Park's artifact and historical collections, with an estimated square footage need of 13,000 square feet.;
- housing for visiting scientists;
- resource management facility to consolidate personnel;
- additional headquarters' office and meeting space to relieve the crowded conditions at Sugarlands; and
- Great Smoky Mountains Association administrative offices.

Visitor Education/Recreation uses:

- Discover Life in America Museum at the Wonderland Hotel;
- museum community (such as at Cades Cove);

- Appalachian crafts and music facility;
- interpretive facility/museum at the Appalachian Clubhouse;
- self- guided walking tour;
- additional traditional recreation opportunities (hiking, fishing, wildlife watching);
- overnight adult education facility to support Great Smoky Mountains Institute at Tremont;
- university extension/educational network facility; and
- group day use facility under special use permits.

Visitor services:

- rental cabins
- retreat facility
- dining facility
- use of hotel
- store/gift shop
- campground shower facility, electrical hookups and a restroom facility for day users

After elimination of those uses that were not appropriate for the District given its geographic location within the Park, the limitations of its road network, or undertaking the use within a public area, four other uses were eliminated in subsequent reviews. The proposed use by the Great Smoky Mountains Associationwas eliminated because it would be inefficient for the organization to store materials within the District and subsequently to transport them to the Sugarlands Visitor Center. The proposed use for Park Headquarters' additional office and meeting space was eliminated due to the inefficiency in communication and lost time due to travel between Sugarlands and the District. The Resource Management Facility was also eliminated for these same reasons. Potential use as an Appalachian crafts and/or music facility was eliminated since there are other locations in the Park and in the surrounding region that provide crafts and music. In addition, these types of activities were not dependent on the history and development of Elkmont for their interpretation. Additionally, those uses solely dealing with campground issues were eliminated (campground shower facility, electrical hookups, and campground store) since they could be evaluated as part of the campground program independent from considerations of the rest of the District. The remaining uses were integrated into the conceptual alternatives.

Public comment on the conceptual alternatives supported many of the proposed uses, particularly those that provided additional visitor services or educational and recreational opportunities. Proposed uses that were favored included reuse of the Wonderland Hotel and Annex as a hotel with dining facilities; cabin rental; use of the Appalachian Club as a day use facility and possibly for dining by those staying at the nearby cabins; and use of three cabins along the Little River as a Visitor Center, museum and educational facility. Strong public support still exists for the direction provided in the 1982 GMP that calls for all buildings to be removed and the area returned to a natural condition.

As part of public meetings, additional new uses were suggested, including restriction to only public vehicles beyond the campground entrance; providing parking for remote shuttling near the Wonderland Hotel; and placement of a historic railroad engine used for logging at the Wonderland Hotel with a railroad exhibit. Park management subsequently determined that the Wonderland Hotel would not be a suitable location for a museum since public access to this area would be constrained by its location and lack of sufficient space for parking. The proposed logging and railroad exhibit was eliminated from further consideration since there are other places within the Park where the story of the logging industry and its impact on Park lands could be more effectively presented to a larger audience. Minimal rehabilitation of the cabins for use as rustic shelters for campers was also considered, but was dismissed due to sanitary considerations.

2.1.1.1 Mandatory Impact Topics

NPS Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision (NPS 2001a) lists 13 impact topics that must be considered in an EIS. The impact topics discussed in detail in this analysis include:

- Possible conflicts between the proposal and land use plans, policies, or controls for the area concerned and the extent to which the Park will reconcile the conflict
- Natural or non- renewable resource requirements and conservation potential
- Urban quality, historic and cultural resources and the design of the built environment
- Socially or economically disadvantaged populations
- Wetlands and floodplains
- Endangered or threatened plants and animals and their habitats
- Important scientific, archeological, and other cultural resources, including historic properties listed on, or eligible for listing on the National Register of Historic Places
- Ecologically critical areas, Wild and Scenic Rivers, or other unique natural resources
- Public health and safety

<u>Mandatory Impact Topics Dismissed from Further Analysis:</u>
Items dismissed from further analysis because they do not apply to the proposed project alternatives or are not known to exist within the District or the larger area of potential impact include:

- <u>Energy requirements and conservation potential</u>
  Use of natural resources as a source of energy required for project implementation as compared to energy use in the existing condition is of consideration. Mitigation

measures can be implemented to conserve energy during and after project implementation. However, scoping did not reveal energy requirements or energy conservation as a topic of concern.

- Prime and unique agricultural lands
  Prime farmland has been designated by the U.S. Department of Agriculture as having the best combination of physical and chemical characteristics for the production of food, feed, forage, fiber and oilseed crops. Prime refers to the productive capacity of the land for crops as affected by soil fertility, growing season and moisture supply. Unique agricultural land is land, other than prime farmland, that is used for production of specific high value food and fiber crops. Unique agricultural areas have the special combination of soil quality, location, growing season and moisture supply needed to produce sustained high quality and/or high yields of a specific crop when treated and managed according to modern farming methods. Both of these categories require that the land is available for farming uses. Lands within the District are not available for farming and therefore, cannot meet these definitions.

- Sacred sites
  Executive Order 13007, released in 1996, states that "in managing Federal lands, agencies must (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites". Confidentiality of the site location is also required by this Executive Order. In accordance with EO 13007, the tribes were consulted and invited to provide information regarding the existence of sacred sites with the District. No such information was provided. Because there are no known sacred sites in the District, this issue is not discussed further in the Environmental Impact Statement.

- Indian Trust resources
  Indian trust assets are assets that the United States holds and administers for Indian tribes. The federal Indian trust responsibility is a legally enforceable, fiduciary obligation on the part of the United States to protect tribal lands, assets, resources and treaty rights. It also represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan Native tribes. There are no Indian Trust resources within the District; therefore, this topic was eliminated from further consideration.

2.1.2 Partnerships

The NPS, through the Park, is the lead federal agency for development of this document for the District. In the future, the Park may form partnerships with local agencies and / or other groups, as appropriate, to implement the plan. However, at this time, the NPS has not established a partnership with any other agency or group.

2.1.3 Special Populations

As required by Director's Order #42 (Appendix A), the NPS must make provisions to accommodate the needs of any special populations who visit the District. Special populations are identified as those with sight, hearing, learning, and mobility impairments, visitors who do not speak English, young children and the elderly. This

Director's Order was formulated by the Department of the Interior following passage of the Americans with Disabilities Act of 1990 (ADA). The ADA technically does not apply to the federal government; however, the Department of the Interior has adopted a variety of design standards for buildings and facilities that were developed by state and local governments to comply with ADA. Adoption of these standards by the Department of the Interior was in response to strong public interest in obtaining access to all public facilities for those with disabilities.

2.1.4 Visitor Carrying Capacity

Resources, such as water, air, vegetation, wildlife, cultural and landscape characteristics, all inherently have a limit beyond which any further impact or use causes a decline in quality or benefit they provide. Under the National Parks and Recreation Act of 1978, the NPS is required to address this issue in its general management plans through establishment of a "carrying capacity" (NPS 1997). The NPS defines visitor carrying capacity as "the level of visitor use that can be accommodated while sustaining the desired resource and visitor conditions in the Park" (NPS 2000).

Although the number of visitors is one consideration when determining carrying capacity, it is not necessarily the primary issue. The decline of a particular resource may be more strongly related to other characteristics of how a resource is used, which may vary depending on the type of use, time of day or year, location, frequency and location of encounters between visitors, and visitor conduct. Another important factor related to carrying capacity is how a visitor perceives the experience they would like to have within a particular setting. For instance, a distinction can be made between the concept of crowding and the simpler concept of amount of use. Many recreational areas are used intensively, but this does not necessarily mean that they are crowded. If a visitor must share space in a visitor center with 10 other people, the situation is not likely to be perceived as "crowded". However, if that same visitor encounters 10 people along a wilderness trail, he or she may describe the condition of the trail as "crowded". Therefore, restrictions on visitor numbers may not effectively address overuse concerns and it may be necessary to employ other management strategies.

Recreational capacity decisions are decisions about people's access to opportunities and the quality of their experiences. Carrying capacity is generally defined as the level of use beyond which impacts exceed acceptable levels specified by evaluative standards (Shelby and Heberlein 1986). In a National Park setting, carrying capacity must consider both the ecological and the social consequences of use levels. Evaluative standards are based on whether the proposed use and characteristics of that use meet the management objectives specified by a park.

As part of the impact analysis required by NEPA for the Elkmont alternatives (Chapter 4), the carrying capacities of the District resources were assessed in terms of the potential direct and indirect effects on individual resources due to implementation of each alternative. The potential cumulative effects were determined as well. Resource impacts can range from none or negligible to a significant adverse effect. Consequences of changes in visitation and type of use implemented under each alternative were estimated. These consequences are discussed in this document in terms of whether or not the

proposed alternatives would remain consistent with the management goals and objectives for all resources if an alternative was implemented.

2.2 Alternatives

The project alternatives analyzed in this document are described in detail in this section, beginning with the No Action Alternative. Potential effects to all resources identified within the District were considered during alternatives development. Measures to avoid and minimize the effects of project implementation on all resources were integrated into each of the alternatives.

As part of this planning process, this document identifies an "environmentally preferred alternative". The environmentally preferred alternative is determined by applying criteria identified in Section 101 of NEPA to all alternatives. NEPA specifies that the alternative that will best protect, preserve, and enhance historic, cultural, and natural resources while causing the least damage to the biological and physical environment is typically considered the environmentally preferred alternative.

Site plans are also provided for each alternative and, based on the specifics of each plan, changes to Park operations and staffing are described, as well as projected project implementation costs (Appendix C). A tabular summary of the major attributes and components and a summary of the proposed infrastructure modifications required to implement each alternative are provided in Tables 2- 17 through 2- 22 at the end of this chapter.

The description of alternatives provided in this chapter uses terminology consistent with that provided in *The Secretary of the Interior's Standards for the Treatment of Historic Properties; with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (*The Secretary's Treatment Standards*; NPS 1995, Revised 2001). To facilitate a better understanding of the alternatives descriptions, the definition of each treatment as provided in *The Secretary's Treatment Standards* is provided in a glossary as part of this document. Other terms utilized throughout this document are consistent with those specified by NEPA and a full explanation of those terms is provided in the glossary as well. Some actions are common to all alternatives, as discussed below.

2.2.1 Actions Common to All Alternatives

Buildings to be Removed under All Alternatives

Although the alternatives differ in many ways, particularly in their impacts on the buildings within the District, there are some activities that would continue to take place regardless of which alternative is selected. One action that is common to all alternatives is removal of specific buildings due to their non- contributing status and/or deteriorating condition. A total of 11 non- contributing buildings and one contributing building are proposed to be removed under all alternatives. In Daisy Town, they include the Galyon rear room, Sneed (#12), Jamerson (#14), Burdette (#16) and Bagley (#17); in Society Hill, they include Gaines (#27) and Knaffl (#36); in Millionaire's Row, they include Parrot (#44), Murphy garage (#45A) and Young (#48); and in the Wonderland Club, they include Bowman/Brown (#58- 4D) and McMillian/Keith (#58- 6F).

Construction Procedures and Protocol

Although each alternative includes a variety of activities required for project completion, specific protocols have been developed by the Park to avoid impacts to cultural and natural resources during removal, restoration, rehabilitation, and reconstruction of buildings. These measures apply to all alternatives.

- Equipment

  If machinery is utilized during removal of buildings, low ground pressure (LGP) equipment must be utilized for all work except hauling on existing roadways. LGP equipment usually has a pressure impact of less than 2 pounds per square inch and can be custom built to fit most applications. It usually has wider tracks and a longer body than traditional equipment. Some LPG equipment also has curved- end track pads to minimize damage to vegetation and the ground surface. However, LGP equipment tracks may damage components of the cultural landscape and may not be suitable for use in rocky terrain. In these situations, rubber tire vehicles with a telescoping hoist (such as a Gradall hydraulic excavator) and / or a combination of this type of equipment and tracking mats or pads should be used.

  Any LPG equipment used will require approval by Park management. Any equipment used during removal operations must also meet US Department of the Interior standards related to transport of weedy plant material. At minimum, vehicles and equipment used in removal operations must be cleaned prior to arriving on site including being washed clean and free of dirt and associated weed plant material.

- Roadway Repairs

  Project implementation may result in accelerated deterioration of some of the existing infrastructure. Specifically, some of the existing roadways within the District that are already in a state of disrepair could be further damaged by heavy equipment if it is used in the removal of the buildings or for other required project activities.

  The roadways that could be most impacted by project implementation, regardless of the alternative selected, are adjacent to the buildings being removed or modified and include Jakes Creek Road (from the Little River Trailhead gate to the top of Society Hill), Daisy Town Loop Road (from Jakes Creek Road to Little River Road), Little River Road (beyond the Little River Trailhead gate) and Catron Branch Road (from Elkmont Road to the end of the Wonderland area cabins). Upon completion of the work associated with this alternative, it is likely that these roadways would require repairs and/or repaving.

Archeological and Cultural Resources

To protect against destruction or degradation of archeological resources, no equipment shall be operated off of existing roadways unless the following criteria are met:

- Define the disturbance area for the area of operation and sample the A horizon within this boundary for archaeological deposits. Use of heavy machinery is not appropriate if significant deposits are present within the A horizon or plow zone (generally defined as the upper 20 cm of the soil column); this would include the

traversing and setup area for demolition. Tracking mats or pads would be insufficient in such cases.

- Assess the potential for impacting buried deposits on a case- by- case basis. Use of heavy equipment for demolition may be acceptable if buried deposits are present (would have to be assessed considering depth, type of deposits, and soil type). Tracking pads or mats could help prevent impacts in some areas. Use of heavy equipment for demolition is acceptable if no significant deposits (other than possible isolated features, etc.) are present.

- Survey adjacent to the buildings prior to ground- disturbing activities

- Survey beneath the buildings if ground- disturbing activities are required (such as foundation removal, etc.)

- Features to remain in the cultural landscape (foundations, rock walls, etc.) will not be driven over or disturbed by construction equipment

Natural Resources Management

Several types of natural resource data would continue to be collected annually from the Little River to compile information on aquatic ecosystems, including water quality, and fish and benthic invertebrate species and distribution. Stream characteristics that would continue to be assessed relating to water quality include temperature, conductivity, flow, mean width, gradient and pH. Fisheries data includes population characteristics such as estimates of the young of year populations, estimates of adult populations, total population estimates, total biomass, species diversity and biomass. These data help managers determine the health of the system and may alert them to problems, such as introduction of a non- native species previously unknown in the Park.

Current Park management policy also includes treatment to eradicate non- native species. Sixteen non- native species have been identified in the District, some of which have been introduced into the District by former residents and now exist as cultural elements. Due to the invasive nature of these plants and the threats they pose to native populations, these species would be eradicated. Table 2- 2 lists the non- native species that have been observed in areas of the District, including Amur honeysuckle (*Lonicera maackii*), common mullein (*Verbascum thapsus*), Chinese yam (*Dioscorea batatas*), English ivy (*Hedera helix*), garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), kudzu (*Pueraria montana*), mimosa (*Albizia julibrissin*), multiflora rose (*Rosa multiflora*), musk thistle (*Carduus nutans*), oriental bittersweet (*Celastrus orbiculatus*), plume grass (*Miscanthus sinensis*), privet (*Ligustrum vulgare*), spiraea (*Spiraea japonica*), periwinkle (*Vinca minor*) and hemlock woolly adelgid (*Adelges tsugae)*. All species listed in Table 2- 2 are plants except for the woolly adelgid, an insect that infests hemlock trees.

Table 2- 2: Non- native Species Observed in the Elkmont Historic District

Areas of the District	Non- native Species Observed
Wonderland Club	Periwinkle, kudzu, musk thistle, Chinese yam, mimosa, garlic mustard
Campground	Privet, common mullein, periwinkle, Amur honeysuckle
Millionaire's Row	Privet, Japanese barberry, multiflora rose, periwinkle, English ivy, oriental bittersweet
Daisy Town	Spiraea, kudzu, Amur honeysuckle
Society Hill	Periwinkle, spiraea, kudzu, plume grass, Japanese barberry, Chinese yam
South of Society Hill	Hemlock woolly adelgid, Japanese barberry, periwinkle

Source: Kichman Pers. comm. 2004

Control methods vary from one species to another and depend on the size and location of the plants targeted for treatment. For instance, if the target plant is in close proximity to native plant species, especially those of special concern, then mechanical methods may be utilized rather than chemical to avoid the potential for overspray onto desirable native species. Management techniques include pulling (common mullein, garlic mustard, Japanese barberry and privet), cutting (common mullein, English ivy and Japanese barberry), applying a foliar herbicide spray (Chinese yam, English ivy, Japanese barberry, multiflora rose, plume grass, privet, spiraea and periwinkle), applying herbicide to a cut stump (English ivy, Japanese barberry and privet) and treating the basal portion of the woody stem with herbicide (English ivy and privet).

Treatment methods utilized to eradicate hemlock woolly adelgid in the District include treating the hemlocks with a soap solution and/or pesticide soil injections. Soap treatments consist of applying a foliar pesticide spray that kills the insects when they feed on the trees' leaves. For effective treatment, the soap solution is best applied twice a year. Soil injection involves injecting a pesticide at the base of infected trees that is subsequently absorbed by the roots, incorporated into the plant tissues and eventually ingested by the insects. A third control method, release of beetles that prey on the hemlock woolly adelgid, is generally reserved for more sensitive, backcountry areas and is not utilized in developed sites such as the District.

All alternatives must avoid diminishing the value of resources or causing a direct loss of those resources. In compliance with natural resource management strategies for the District, all alternatives must:

- protect streams, seeps, wetlands and floodplains;
- provide water resource management methods consistent with responsibilities outlined for Outstanding National Resource Waters;
- protect federally- listed threatened and endangered species and their habitats;
- protect high montane alluvial forest and its ability to regenerate;
- avoid loss of habitat for the synchronous firefly population;
- ensure that visitor use levels are maintained within the level natural resources have the ability to sustain; and

- minimize areas of disturbance and maximize the use of previously disturbed areas.

Other Impact Avoidance Measures for Natural Resources

- Because of the increase of non- native plant species as a result of disturbance related activities, Park personnel will perform non- native plant survey and eradication around buildings slated for removal *prior to* removal activities.

- Tree removal to create access to a structure shall be avoided during summer (April 15 to October 15). If tree removal is required for safety reasons or to implement the building removal strategy, no trees larger than 6 inches diameter at breast height (dbh) shall be removed without surveys of the exfoliating bark for bat species and canopy for nesting raptors.

- Snags greater than 3 inches dbh should be retained regardless of species. Exceptions for snag removal are those trees that may be potentially hazardous. Live tree and snag removal should be allowed in those instances where the tree poses a safety hazard in recreation, trails, or administrative use and roadway rights- of- way; these trees should be surveyed for use by bats or raptors before removal.

- Tree limb and canopy damage shall be avoided or minimized to the extent practicable. To prevent or minimize limb damage, the swing of the hoist and bucket will be adjusted to avoid mid- canopy and upper- canopy branches and limbs.

- Avoid threatened, endangered and special concern species. A perimeter surrounding butternut trees will be fenced off at 1.5 times the maximum canopy drip line radius or beyond, if possible, to avoid impact to the tree trunk and limbs or potential soil compaction at the base. A perimeter surrounding Fraser's sedge will be fenced off at a radius of 10 meters from the plant population.

- Include a setback distance for work zones adjacent to waterways, wetlands and floodplains. Setback for work adjacent to the Little River, its tributaries, 100- year floodplain and delineated wetlands should follow buffer establishment guidelines, providing for a minimum 50- foot buffer (increased by 2 feet for every 1 percent change in slope). No equipment shall be operated within this buffer, waterways, 100- year floodplains or wetlands. In addition, no materials shall be stored in these areas or vehicular traffic allowed, except on existing roadways.

- Avoid impacts to bat populations utilizing the buildings or trees. Eleven species of bats are found in the Park, including the little brown bat, northern long- eared bat, Indiana bat, eastern small- footed bat, big brown bat, evening bat, Rafinesque's big-eared bat, silver- haired bat, eastern pipistrelle, eastern red bat, and hoary bat. Although no threatened, endangered or special concern bat species are known to occur in Elkmont Historic District, bats have been observed within the buildings and potential habitat exists throughout the area.

  The maternity season for several of these bat species begins in mid- April and young are flying by mid to late August. Roosting season is from April to September. Species

known to roost in buildings include the little brown bat, northern long- eared bat, Indiana bat, eastern small- footed bat, big brown bat, evening bat, and Rafinesque's big- eared bat. Big brown bats can hibernate in buildings; other species of bats hibernate in caves or migrate to other locations. The silver- haired bat sometimes utilizes buildings during migration. Hibernation for bats within the Park is from October or November to the end of March.

Structure removal will only be permitted to occur between September 1 and April 1 of the calendar year. If at the time of removal the most recent bat survey is greater than two years old, a new bat survey will be required prior to removal activities. This study should be conducted in mid summer and carefully coordinated in order to avoid potential delays due to the September 1 to April 1 window for construction activities.

- Avoid disturbance of nesting bald eagles. The nearest known location of nesting bald eagles is in the Fontana Lake area along the southern Park border. However, if a nest is located within any construction area, work within 800 meters of the nest should not commence until after August 31, with completion by December 31. Restricting work to this time period will avoid disruption during the breeding period for bald eagles.

The Secretary's Treatment Standards

All of the project alternatives propose some level of modifications to the historic buildings within Elkmont Historic District. Listing of the District on the National Register of Historic Places in 1994 mandates that actions specified in the proposed alternatives comply with *The Secretary's Treatment Standards* (NPS 1995, Revised 2001). The Secretary of the Interior holds the responsibility for acting in an advisory role in protection and preservation of all cultural resources listed in or eligible for listing in the National Register of Historic Places, and *The Secretary's Treatment Standards* are the Secretary's advice on how to protect a wide range of historic properties. By separate regulation, the Secretary has required the application of the standards and guidelines in certain programs administered through the NPS, including all proposed development grant- in- aid projects assisted through the National Historic Preservation Fund.

The treatment standards are designed to be applied to all historic resource types included on the National Register of Historic Places such as buildings, sites, districts, and objects. The treatment guidelines apply to specific resource types (the type found in the Elkmont Historic District is buildings) and provide specific guidance on modification of building interiors and exteriors, including acceptable methods of working with types of building materials, such as wood or masonry.

The Elkmont Historic District project alternatives propose treatments such as restoration, rehabilitation and reconstruction of the historic buildings, and preservation of cultural landscape features. These proposed treatments have been developed in consideration of this guidance for historic buildings, as well as the cultural landscape of the District (see Appendix B) and its archeological resources.

Reconstruction

One treatment proposed by several of the project alternatives involves reconstruction of the Wonderland Hotel because it has failed structurally. The Department of the Interior defines reconstruction as the act or process of depicting, by means of new construction, the form, features, and detailing of a non- surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. The NPS has specific policies regarding reconstruction. Director's Order 28 (NPS 1998c) states that reconstruction is a last- resort measure for addressing a management objective and is only allowed with specific written approval of the Director after a policy review at the Washington level. In addition to approval by the Director, NPS Management Policies (NPS 2000) indicate that the NPS will not reconstruct a missing structure unless:

1) There is no other alternative that would accomplish the Park's interpretive mission;
2) sufficient data exists to enable its accurate reconstruction, based on the duplication of historic features substantiated by documentary or physical evidence, rather than on conjectural designs or features from other landscapes; significant archeological resources will be preserved in situ or their research values will be realized through data recovery;
3) reconstruction will occur in the original location; and
4) the disturbance or loss of significant archeological resources is minimized and mitigated by data recovery.

Reconstruction of the Wonderland Hotel would be conducted in accordance with *The Secretary's Treatment Standards* (NPS 1995, Revised 2001) and would comply with the standards for reconstruction (NPS 2004f) as follows:

1. Reconstruction will be used to depict vanished or non- surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.

2. Reconstruction of a landscape, building, structure, or object in its historic location will be preceded by a thorough archeological investigation to identify and evaluate those features and artifacts that are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures will be undertaken.

3. Reconstruction will include measures to preserve any remaining historic materials, features and spatial relationships.

4. Reconstruction will be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property will re- create the appearance of the surviving historic property in materials, design, color and texture.

5. A reconstruction will be clearly identified as a contemporary re- creation.

6. Designs that were never executed historically will not be constructed.

According to *The Secretary's Treatment Standards*, the goal of reconstruction is to make the building appear as it did at a particular and most significant time in its history. Remaining cultural landscape features should be retained to provide a sense of the historic setting. The use of traditional materials and finishes is always preferred for visible features. For non- visible features, such as interior structural or mechanical systems, it is expected that these will be contemporary upgrades, but that they will be obscured from view as much as possible. For interior spaces, *The Secretary's Treatment Standards* specify identifying, retaining and preserving a floor plan or interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves.

The Secretary's Treatment Standards allow, but do not recommend, altering a floor plan or interior spaces that are important in defining the overall historic character of the building so that, as a result, the character is diminished. Any reconstruction proposed for the Wonderland Hotel under the proposed project alternatives would have to consider the *The Secretary's Treatment Standards* and the spirit of the recommendations provided therein. Non- intrusive modifications to accommodate temperature and humidity controls, and other storage requirements of a curatorial facility may be required. The types of modifications necessary could include alteration of some of the interior layout of individual rooms.

Interpretation

All of the project alternatives propose installation of wayside exhibits. Two of these exhibits are included in all of the alternatives. One would be placed in the Elkmont Campground and would provide a description of the history of the Town of Elkmont. A second exhibit would be placed in Millionaire's Row and would include a description of the District's synchronous firefly population. Various other exhibits are proposed for Alternatives B through F2 , and are described in the narrative for each alternative that follows in this chapter.

Elkmont Campground

Alterations to the campground and its associated buildings and facilities are not under consideration as part of any alternative in this analysis because the purpose of this analysis is to reevaluate the current management plan for the Elkmont Historic District buildings as specified in the 1982 GMP. There will be no change in campground management as outlined in the 1982 GMP. In addition, no changes to modern Park buildings, such as those associated with the campground and Quarters 434 and 600, are proposed under any alternative. These buildings are not related to the Appalachian or Wonderland Clubs, were constructed after the District's designated period of significance, and would remain under all alternatives.

Infrastructure Modifications

Various modifications to infrastructure, including water, wastewater treatment, roadways and parking are proposed under Alternatives B, C, D1, D2, E1, E2, F1 and F2. The methodology for determining water and wastewater quantities and roadway and parking needs is provided in detail as part of the discussion for Alternative B. This methodology was applied to the remainder of the alternatives (C through F2). Therefore, the discussion provided under Alternative B regarding infrastructure modifications is applicable to Alternatives C through F2.

Pavement

The sites selected for parking areas were based on locations that would not intrude onto the 100- year floodplain of the Little River or its tributaries, areas which had experienced previous ground disturbance and/or contained little vegetation, and locations conducive to vehicular and pedestrian circulation. Parking areas were also placed in locations that allow space for a vegetated buffer between the parking area and the surface water. A variety of surface treatments for parking areas were considered including gravel, bituminous asphalt, conventional concrete, and pervious concrete. Selection of pavement material was based on its ability to contain the "first flush" of storm water runoff for pollutant capture, thereby minimizing the amount of storm water runoff that would reach surface waters.

Of the potential paving treatments, only pervious concrete meets the criteria of containing the first flush of storm water. Pervious concrete possesses many of the best qualities of the other surfaces, is an ADA compliant surface with exceptional strength and durability, and perhaps most importantly, its surface is pervious. Therefore, it provides superior infiltration capabilities and significantly reduces surface runoff. Pervious pavement allows water and oxygen to enter below the soil surface. It can reduce or eliminate the need for retention or detention ponds in areas surrounded by a vegetative buffer. Recent studies have shown that pervious pavement produces the best removal of pollutant loads, with greater than 80% removal of most contaminants in areas paved with pervious pavement surrounded by vegetative buffers (Rushton 2002). Minor maintenance is needed to ensure that pervious pavement retains its infiltration capacity and its pores do not become clogged with fine sediments tracked in on vehicle tires. Therefore, periodic (once per 1- 2 years, or as conditions require) pressure washing or vacuuming of pervious pavement would be necessary.

Wastewater

The Elkmont wastewater treatment plant contains a conventional extended aeration activated sludge biological process with tertiary filtration. This is a time tested treatment process that typically performs very well under a variety of wastewater flow conditions. The extended aeration process has built- in buffering capacity allowing influent flows to be erratic during the course of a day. This allows the treatment plant to receive flows that vary both above and below the 35,000 gallon per day (gpd) design flow for the plant. This treatment flexibility is needed to accommodate the variable diurnal flow characteristics that result from the campground and would also result from potential new wastewater sources generated by some of the proposed alternatives.

The hydraulic design capacity of the wastewater treatment plant, which is currently 35,000 gpd, is based on average daily flows with the capability to adequately treat much higher daily flows for short periods of time. Since the wastewater treatment plant must react to the variable flows that are received day to day, the terms of the discharge permit allow the plant flow to vary considerably while maintaining adequate biological treatment to meet the Little River discharge parameters.

Monthly Operating Reports for the Elkmont wastewater treatment plant revealed that the average daily flow through the plant for the years 1998 through 2003 was 9,976 gpd, while the average daily flow for the years 1998 through 2000 was 7,660 gallons per day. For the years 2001 through 2003, the average daily flow was recorded at 12,291 gallons per day. Although the reason for these average day flow variations are not able to be determined, as a conservative measure, calculations have utilized the average flow for the more recent three (3) year period as average base flow conditions.

During this same period, the plant flow exceeded 30,000 gpd on several occasions as a result of operational issues, such as the recirculation of decanted backwash water and flush valve problems in the campground restrooms. However, on the average, the peak day flows for wastewater are approximately 30,000 gpd.

Wastewater Projections

When preparing the wastewater projections for each alternative, the peak flow conditions were considered more prominently due to the unpredictable daily visitation patterns of day use visitors and the expected daily wastewater flows from the facilities in Alternatives E1 through F2. This approach also provides even more treatment buffering capacity in the treatment plant to best protect the Little River under any unexpected wastewater flow conditions.

The projected wastewater flow to be added in Alternatives B and C from the restroom facilities at the Appalachian Clubhouse is 1,300 gpd. This is a minor additional flow that can be adequately treated without any plant improvements or increase in the discharge pollutants.

In Alternatives D1, D2 and E1, additional wastewater flows projected would be 2,268 gallons per day, 3,635 gallons per day and 5,888 gallons per day, respectively. These additional daily wastewater flows are not anticipated to stress the hydraulic capacity of the treatment plant, although they would increase the erratic diurnal flow pattern with much of the daily flow entering the plant during peak flow times. This issue would be addressed by construction of a flow equalization basin at the head of the plant that would receive the daily flow and release it into the plant at a constant flow. This is the only improvement to the wastewater treatment plant needed to support Alternatives D1, D2 and E1.

The projected additional wastewater flows in Alternatives E2 and F2 range from 14,375 gpd to 23,467 gpd, respectively. Due to the expected additional daily flows as based on the projected lodging occupancy rates, a 5,000 gpd increase in the design capacity of the treatment plant would be required in Alternatives E2 and F1, while F2 would require a 15,000 gpd increase. Treatment of this additional effluent cannot be accommodated by

the existing wastewater treatment system. Because increases in hydraulic discharge are not permitted to occur under the terms of the existing permit or the Tennessee Antidegradation Statement, additional treatment would have to be provided at another location that would not result in direct discharge of treated effluent into the Little River.

Thermal Effects of Wastewater Discharge

The wastewater treatment plant discharges its treated effluent into the Little River at river mile 49.6. The discharge has been entering the Little River at this location for more than 30 years. The quality and quantity of the discharge is well documented during this period in the Monthly Operation Reports and the Discharge Monitoring Reports that are prepared by the plant operator for the NPS and submitted to the Tennessee Department of Environment and Conservation in accordance with the National Pollutant Discharge Elimination System (NPDES) Permit. Since a record of the temperature of the effluent wastewater and of the Little River at the point of discharge is not required in the discharge permit or for the operation of the treatment plant, there is no historic temperature data at this location.

According to NPS records, the wastewater temperature in the wastewater treatment plant as it enters the discharge pipe varies seasonally from an average of approximately 63°F during the spring and fall months to an average of approximately 72 °F during the summer months. Based on water temperature data collected during the past 40 years from two (2) USGS gauging stations located upstream and downstream of the wastewater discharge point, the average river water temperature is 57° F during the spring months, 67°F during the summer months and 51°F during the fall months. The average temperature differential of the wastewater in the treatment plant and the water in the river varies from 5°F to 12°F.

The wastewater leaves the treatment plant through an 8- inch diameter underground pipe that has a moderate slope for approximately 40 feet, and then it levels out over the last approximate 70 feet to the discharge point in the river. The discharge pipe outlet is submerged under the river water surface in a swiftly flowing channel that appears to be the deepest part of the river channel at that location. The 70 foot flat section of discharge pipe leading to the river remains surcharged with river water at all times.

The discharge flow from the wastewater treatment plant to the river is intermittent rather than continuous. The plant is designed such that the settling clarifier flow is pumped intermittently into the disinfection basin and then flows by gravity to the river as previously described. Therefore, wastewater is discharged to the Little River only when the discharge pump is operating. Since the discharge pumping capacity rate is 40 gallons per minute, this is the rate of discharge during the pumping cycles with no discharge going to the river when the pump is not operating. For example, when the daily flow through the plant is 10,000 gallons, the discharge enters the river intermittently for a total of only 250 minutes (4.2 hours) during the 24 –hour day. At a flow rate of up to 50,000 gallons per day, the discharge would be occurring at the same rate of 40 gallons per minute as it currently does for a total of 20.8 hours.

Due to the existing configurations and operating characteristics of the treatment plant, some cooling of the wastewater occurs in the discharge pipe between the plant and the

actual discharge into the Little River. This cooling occurs in the section of discharge pipe that lies at a flat grade below the water level in the river. This section of pipe is surcharged with cooler river water when the discharge is not occurring, which lowers the temperature of the wastewater as it intermittently flows through the pipe. At 40 gallons per minute flow rate, the velocity in the pipe is approximately 0.25 feet per second allowing a residence time of the wastewater in the pipe of approximately 4.6 minutes.

Field measurements were taken of wastewater temperature as it flows out of the treatment plant immediately before it exits the pipe at the submerged discharge point in the river. The temperature of the wastewater in the pipe leaving the plant was 63.3°F. The temperature of the wastewater in the pipe 2 feet before entering the river was 61.5°F and 61 °F at the end of the pipe that discharges into the river. These measurements were taken after the discharge pump had been operating for about 45 minutes so that the interior surface of the discharge pipe had already warmed to a more stable temperature. The wastewater residence time in the discharge pipe was recorded at 4 minutes and 50 seconds, which confirms the rate of discharge at approximately 40 gallons per minute. Water temperature in the river at the same submergence elevation as the discharge pipe was also measured both upstream and downstream from the discharge pipe. The river temperature approximately 3 feet upstream was 58.8°F. Downstream temperatures were taken at distances 1, 2 and 3 feet from the discharge pipe and found to be 59.7 °F, 58.9°F and 58.8°F, respectively. Under these conditions, the warmer temperature of the wastewater was dissipated entirely within 3 feet of the discharge point. With the constant discharge rate and the relative stability of the heat transfer rate, it is reasonable to conclude that under the range of seasonal temperatures of both the wastewater and the river water, the thermal effects of the wastewater discharge would not measurably vary from the existing conditions regardless of the daily discharge from the plant.

Wastewater Treatment Options

The conceptual approach to addressing the treated wastewater discharge in the Little River for all of the alternatives was to comply with the Outstanding National Resource Waters (ONRW) designation (Tier 3) through the Tennessee Antidegradation Statement contained in Chapter 1200- 4- 3 General Water Quality Criteria of the Rules of the Tennessee Water Quality Board. Although there would be no additional amount of pollutants discharged to the Little River and no degradation of the current water quality associated with wastewater discharge under any of the alternatives, the Tennessee Antidegradation Statement also implies that no additional increase in hydraulic capacity of wastewater treatment systems currently discharging to the Little River would be allowed. Therefore, alternatives that require an expansion of the existing plant (Alternatives E2, F1 and F2) could not be accommodated within the District unless a treatment strategy would be implemented that did not result in direct discharge to the Little River. Alternatives B through F2 all propose various levels of upgrades to the wastewater treatment system to accommodate the need created as facilities and proposed lodging are added. Strategies considered for providing wastewater collection and treatment services associated with all of the alternatives included (1) individual septic collection with subsurface infiltration, drip irrigation, or pressure mound disposal; (2) constructing holding basins for pump and haul to a local wastewater treatment facility;

and (3) connection to existing wastewater system. All three methods are described below.

Individual septic collection with subsurface infiltration, drip irrigation, or pressure mound disposal.

This strategy involves three (3) alternative methods for wastewater disposal in conjunction with a septic tank system. The first method examined would include conventional septic tanks and subsurface infiltration drain field technology to serve individual buildings. The second method would require a larger septic tank serving multiple buildings and a low- pressure pump and piping system that distributes the wastewater into the soil through perforated small diameter drip irrigation piping. The third method would require an elevated sand/soil mound that allows sewage disposal in areas where subsurface soil quality would not qualify for subsurface infiltration or drip irrigation. A mound system would remove the effluent from a septic tank and pump it from a dosing tank and the wastewater would then be sprayed into a gravel bed within an elevated mound of sand/soil. Unlike other on- site sewage disposal systems, primary and final treatment of the effluent in this method takes place within the sand/soil of the mound and not within the surrounding soil.

The use of conventional septic systems and/or low- pressure drip irrigation systems would not be desirable due to the generally poor quality of the soils throughout the District for these purposes. The use of individual on site disposal systems could also result in a significant amount of ground disturbance and tree/vegetation removal with each installation. In addition, regeneration of vegetation in these drain field areas would be detrimental to the long- term effectiveness of the systems. As a result, the area would have to be maintained to prevent reestablishment of vegetation.

A drip irrigation/disposal system could be constructed, as necessary, to treat and dispose of the additional wastewater generated by the selected alternative over and above the design capacity of the existing wastewater treatment plant. However, as described above, given the soil characteristic within the District, locating a reliable long-term location for such a system is not likely. As a result, if a drip irrigation/ disposal system were installed to accommodate the wastewater treatment needs of an alternative, a suitable site for this system would have to be identified outside of the District. Wastewater exceeding the current capacity of the existing wastewater treatment plant would then be pumped to the drip irrigation site for treatment. Pressure mounds are not generally preferred methods of wastewater disposal for public facilities because they involve open- air treatment processes that are visible to the general public and are therefore, much less aesthetically appealing and more vulnerable to vandalism.

Construct holding basins, then pump and haul wastewater to a local treatment facility

One option for wastewater management would be to construct a gravity collection system in which wastewater is collected and retained in holding basins. A tank truck would periodically pump the sewage into a storage tank and transport it off site to a wastewater treatment facility for treatment and disposal. This strategy is typically employed when site conditions disallow on- site treatment and disposal. Because the

wastewater would typically turn septic, the storage vault would require odor control measures such as chemical treatment or aeration and would have to be located in an area easily accessible by the septic hauler. The Tennessee Department of Environment and Conservation has indicated that they would only permit pump and haul installations as a last resort and usually for a temporary period until other on site wastewater treatment options can be implemented.

Connection to existing wastewater system

The connection to and extension of the existing wastewater collection system would be accomplished in different ways depending on the site circumstances. A gravity collection system would be constructed as is practical by the topography at each site location. This option would generally provide the lowest long- term operation and maintenance cost and would result in a much lower impact to the environment as compared to individual septic systems. The use of individual grinder pump stations with small diameter force mains, which would be located at each structure receiving wastewater service, would be constructed in areas where the topography is not suitable to achieve gravity flow. The wastewater would be pumped from these stations into a central gravity collection line or a larger pressure force main, depending on the particular circumstances of the service area. A third strategy would include the use of a larger, centrally- located wastewater pump station that collects wastewater via gravity collection lines to a central point where it is pumped via a pressure force main to a point where it can again flow by gravity. The use of pumping equipment generally increases the operation and maintenance costs of the associated system. However, the installation of the associated pressure force main piping can generally be accomplished with much less ground disturbance than gravity collection lines and at a significantly reduced capital cost because of the relatively small size of the force main as compared to gravity piping. The use of individual grinder systems would prove cost effective when serving a relatively low number of buildings that are more removed from the collection system and where gravity sewer lines are not possible due to topography constraints.

Based on the estimated wastewater flows generated by alternatives B through E1, it may be possible to modify or expand the capacity of the existing wastewater treatment plant. Due to fluctuations in the volume of daily flows currently observed at the plant, relatively minor additions to the overall peak wastewater flows would be addressed through the construction of a flow equalization basin. This measure would help the plant operate more efficiently by storing peak wastewater inflows until the peak has subsided.

Recommended Wastewater Plan

For alternatives that do not exceed permitted discharge levels, the recommended strategy for providing wastewater service is to connect to the existing wastewater collection system within the District and to modify the existing wastewater treatment plant, where necessary, to accommodate the projected wastewater flows. This strategy would provide the most cost effective solution in managing wastewater treatment and disposal needs without additional pollutant loadings to the Little River.

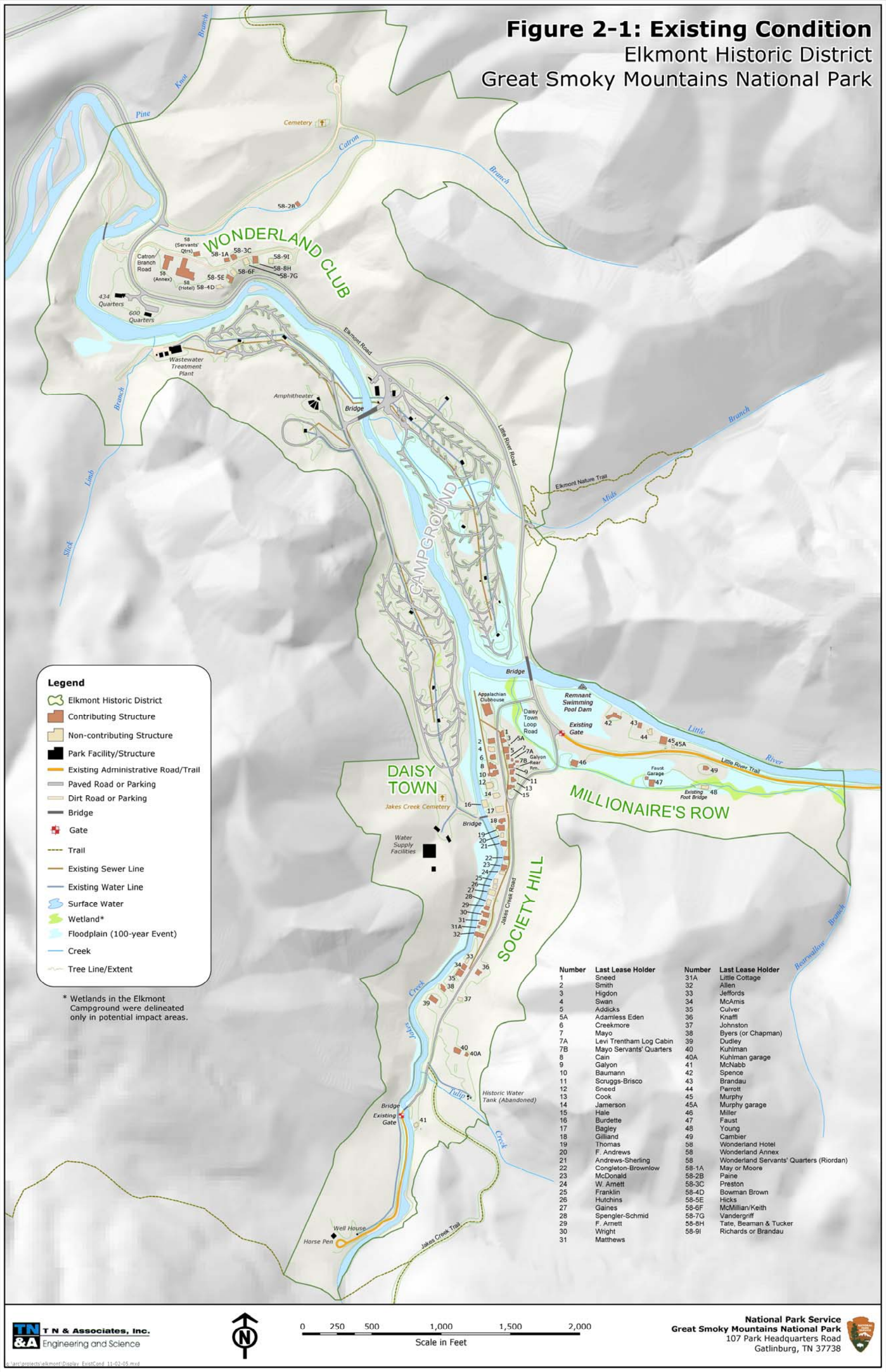
The connection to and extension of the existing wastewater collection system would be accomplished in a number of different ways including a gravity collection system, the use of individual grinder pump stations, and/or a larger, centrally- located wastewater

pump station, depending on the particular circumstances of the service area. The use of pumping equipment generally increases the operation and maintenance costs of the associated system over gravity systems. However, the installation of the associated pressure force main piping can generally be accomplished with much less excavation than gravity collection lines and at a significantly reduced capital cost because of the relatively small size of the force main compared to gravity piping. The use of individual grinder systems may prove cost effective when serving a relatively low number of buildings that are farther away from the collection system. This strategy also makes use of the existing wastewater collection system and its available capacity. As discussed previously, because larger wastewater flows would be generated following implementation of Alternatives E2, F1 and F2, it would necessary to expand the capacity of the existing wastewater treatment plant. However, because environmental regulations prohibit expansion of the hydraulic capacity of the existing plant, the additional wastewater treatment would have to occur at an alternate location, either through addition of a drip irrigation system located in a suitable area outside of the District or by piping the wastewater to the nearest treatment plant in Gatlinburg. If either of these methods were utilized, a separate investigation of the potential resource impacts associated with construction these systems would be required prior to implementation.

To facilitate an understanding of the scope of the proposed changes under each alternative, the existing condition of the District is depicted on the following page (Figure 2- 1). References to buildings and last leaseholder names on this map and elsewhere in the document are consistent with those listed in the District's 1994 National Register of Historic Places nomination. Through the public involvement process, the Park has been made aware that some discrepancies exist in the last leaseholder name for several buildings as shown in the nomination. However, this document uses names consistent with the National Register listing to avoid confusion regarding which buildings are discussed in this document. All last leaseholder names, as described in the National Register of Historic Places nomination, are listed on Figure 2- 1. The figures that depict alternatives (Figures 2- 2 through 2- 8) only list the last leaseholder names for those buildings proposed to be retained under each alternative.

Figure 2-1: Existing Condition

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District
- Contributing Structure
- Non-contributing Structure
- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Gate
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek
- Tree Line/Extent

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

Number	Last Lease Holder	Number	Last Lease Holder
1	Sneed	31A	Little Cottage
2	Smith	32	Allen
3	Higdon	33	Jeffords
4	Swan	34	McAmis
5	Addicks	35	Culver
5A	Adamless Eden	36	Knaffl
6	Creekmore	37	Johnston
7	Mayo	38	Byers (or Chapman)
7A	Levi Trentham Log Cabin	39	Dudley
7B	Mayo Servants' Quarters	40	Kuhlman
8	Cain	40A	Kuhlman garage
9	Galyon	41	McNabb
10	Baumann	42	Spence
11	Scruggs-Brisco	43	Brandau
12	Sneed	44	Parrott
13	Cook	45	Murphy
14	Jamerson	45A	Murphy garage
15	Hale	46	Miller
16	Burdette	47	Faust
17	Bagley	48	Young
18	Gilliland	49	Cambier
19	Thomas	58	Wonderland Hotel
20	F. Andrews	58	Wonderland Annex
21	Andrews-Sherling	58	Wonderland Servants' Quarters (Riordan)
22	Congleton-Brownlow	58-1A	May or Moore
23	McDonald	58-2B	Paine
24	W. Arnett	58-3C	Preston
25	Franklin	58-4D	Bowman Brown
26	Hutchins	58-5E	Hicks
27	Gaines	58-6F	McMillian/Keith
28	Spengler-Schmid	58-7G	Vandergriff
29	F. Arnett	58-8H	Tate, Bearman & Tucker
30	Wright	58-9I	Richards or Brandau
31	Matthews		

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National Park Service
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, TN 37738

2.2.2 No Action Alternative (1982 General Management Plan)

2.2.2.1 Concept

NEPA requires a "No Action" Alternative to describe what would happen if current management direction were to continue into the future in terms of resource management and visitor experience. The No Action alternative implies that no change in activity is undertaken and that existing management practices would be sustained. Taking no action at Elkmont is tiered to, and incorporates the direction of the 1982 General Management Plan, which calls for removal of all of the historic buildings within the District and allows for natural regeneration of plant communities.

The proposed work would consist of either mechanical removal of the historic buildings or removal by hand. Most remnants of building foundations and stonework could remain as a link to the past occupation of the District. The General Management Plan directs that building sites would be returned to a natural state. No changes to Modern Park buildings, such as those associated with the campground and Quarters 434 and 600, are under consideration for any alternative in this analysis. These buildings are not related to the Appalachian or Wonderland Clubs and were constructed after the District's designated period of significance and would remain. Table 2- 3 provides a summary of the proposed treatment for all buildings under the No Action Alternative. The alternative is depicted on Figure 2- 2.

Table 2- 3: Buildings Summary for the No Action Alternative

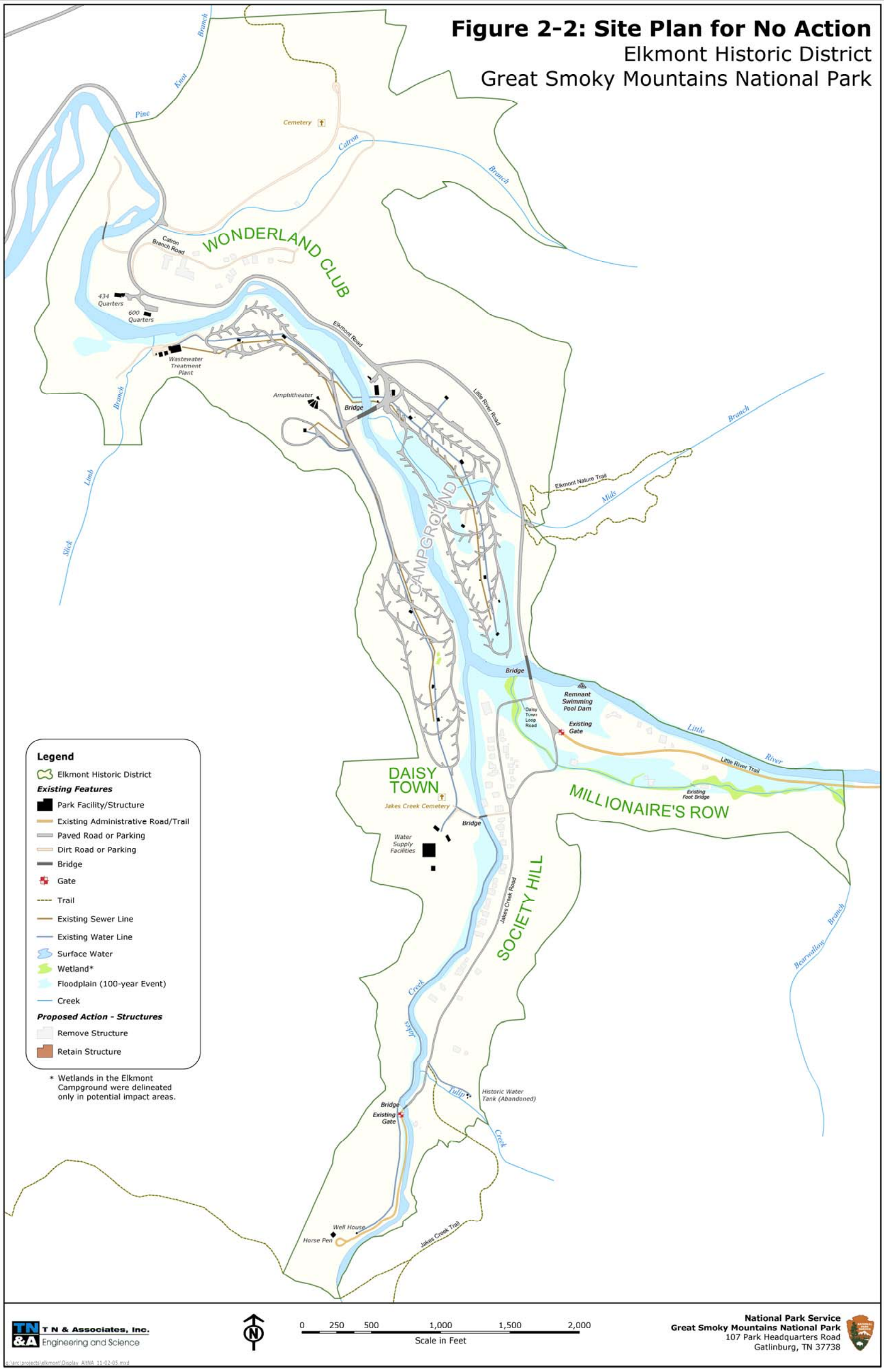
Area/Buildings	Status	Uses
Wonderland Club Area		
Wonderland Hotel	Remove	Natural regeneration of plant communities
Annex	Remove	Natural regeneration of plant communities
Cabins	Remove all	Natural regeneration of plant communities
Millionaire's Row	Remove all	Natural regeneration of plant communities
Daisy Town		
Appalachian Clubhouse	Remove	Natural regeneration of plant communities
Cabins	Remove all	Natural regeneration of plant communities
Society Hill	Remove all	Natural regeneration of plant communities

2.2.2.2 Land Protection

Land protection plans are developed by the NPS to ensure that protection of Park resources is provided for in the management objectives for an area. The No Action Alternative would provide land protection measures by being consistent with the Park's mission in preservation of natural resources and some cultural resources. Natural resources would be protected by returning building sites to a natural state upon removal of buildings and structures. Although the historic buildings and structures would be removed, some cultural landscape features and archeological resources would remain as a link to the past human occupation of the District.

Figure 2-2: Site Plan for No Action

Elkmont Historic District
Great Smoky Mountains National Park



2.2.2.3 Cultural Resource Management
The General Management Plan states "Significant cultural resources will be preserved and studied. Buildings, sites, and objects representative of the Appalachian folk culture will continue to be interpreted" (NPS 1982). However, Elkmont was not identified as having significant cultural resources at the time the 1982 Plan was adopted and it was not listed on the National Register of Historic Places as a District until 1994, 12 years subsequent to the development of the Plan. The General Management Plan further states, "Less significant historic features that do not qualify for the National Register will be allowed to undergo natural deterioration, and the sites will be reclaimed by natural processes" (NPS 1982). Consistent with this policy, the management direction for Elkmont, as specified in the 1982 Plan, calls for removal of the buildings and returning the building sites to a natural state. The 1982 Plan does not provide direction regarding remaining cultural landscape features.

The No Action Alternative meets the overall management objectives for cultural resources by protecting some cultural resources, cultural landscape features, and archeological resources. While all of the buildings would be removed, efforts would be made to retain some culturally significant features, such as remnants of building foundations, stonework and other visible cultural deposits, that would remain as a link to the past occupation of the District. Building sites would be returned to a natural state following removal of the buildings. This approach would be compatible with the management objectives established for the District (Section 1.4) in ensuring that cultural resources and settings are maintained in a manner compatible with natural resource management objectives. With the removal of the buildings, a decrease in Ranger patrols, Park operations and staffing are anticipated due to the elimination of the need for resources to stabilize historic buildings and to provide visitor protection services related to building hazards.

2.2.2.4 Natural Resource Management
The General Management Plan indicates that "Special management will generally be given to endangered or threatened species and to species or systems having particular scientific or aesthetic value and/or fragility. This will be accomplished by diverting or eliminating human activities or non- native species that may threaten these features or by allowing or compensating for natural occurrences on which some communities and species depend" (NPS 1982).

At Elkmont, as in the rest of the Park, natural resource management direction is to identify or locate species or specific features of the Park that may have special value or vulnerability that the Park deems in need of special management. The No Action Alternative proposes to continue these monitoring activities throughout the District. Current Park management policy also includes treatment to eradicate non- native species. Under the No Action Alternative, non- native species management would continue at its current level. The No Action Alternative would generate no additional discharge or run- off into the Little River or its tributaries; maintain or propose no additional activities within floodplains; and limit visitor use activities that could potentially tax site carrying capacity. Consistent with guidance provided in the 1982

Plan, the No Action Alternative would allow for natural regeneration of forest in areas where buildings are removed.

2.2.2.5 Interpretation and Visitor Use

According to the General Management Plan, the basic objective of the interpretive effort is to demonstrate to visitors the value of the Park as a sanctuary from some of the effects of the modern technological world and to show how the special qualities of such a sanctuary relate to and benefit people. Opportunities to view the Park by vehicle, hiking, picnicking, camping and fishing all occur within the District. These opportunities would continue to be available to all visitors if the No Action Alternative was implemented.

The No Action Alternative would allow regeneration of ecosystems and recovery from past logging and human occupation; providing visitors with opportunities to learn about the natural resources that comprise Elkmont; and maintain existing levels of traditional recreation, such as hiking and camping.

2.2.2.6 Facilities Development with Detailed Site Plans for the No Action Alternative

Under the No Action Alternative, all of the historic buildings would be removed. Removal would be accomplished either by mechanical means or by hand removal. Foundations and other features that could serve as a link to the past human occupation of Elkmont could remain if they do not present a safety hazard to visitors. Former building sites would be revegetated in accordance with guidance provided in the 1982 Plan. Reestablishment of vegetation would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas.

Infrastructure Needs

No infrastructure improvements would be necessary to accommodate the needs of this alternative. Per the General Management Plan, roadways damaged during project implementation will be repaired and other roadways maintained as needed. Once required repairs are made, no additional operation and maintenance expenditures will be necessary for these roadways over and above those funds presently budgeted for the operation and maintenance of existing roadways within the District. Primary features of this alternative are summarized below in Table 2- 4.

2.2.2.7 Estimated Development Costs

The estimated range of costs for site development and implementation of the No Action Alternative is provided in Appendix C of this document. An itemized list of costs and post- construction operation and maintenance costs are provided. Total costs of the No Action Alternative are based on estimating the funds necessary to perform the following items:

- Building removal
- Infrastructure maintenance
    - Existing roadway repairs
- Vegetation management

Table 2- 4: Summary of Implementation Features for the No Action Alternative

Use of Historic Buildings	None; all historic buildings are proposed to be removed
Specific Measures for Buildings Retained	None; all historic buildings are proposed to be removed
Natural Resources Management	Continued implementation of current management activities including hemlock pest management, non- native vegetation management, water quality monitoring, and fish population assessment
Visitor Use	Visitation is not expected to change significantly. Camping, fishing, hiking and other compatible recreation would continue.
Interpretive Features	No changes to existing interpretive features are proposed
Access / Circulation	No changes to existing access or circulation are proposed
Parking	No parking improvements or changes are proposed
Utilities	No changes to existing utilities are proposed
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	Decrease in Ranger patrols, Park operations and staffing are anticipated with implementation of this alternative by eliminating the need for resources currently being utilized to stabilize the historic buildings and provide visitor protection related to building hazards. Retain the current level of general maintenance to existing infrastructure.

2.2.3 Alternative A

2.2.3.1 Concept

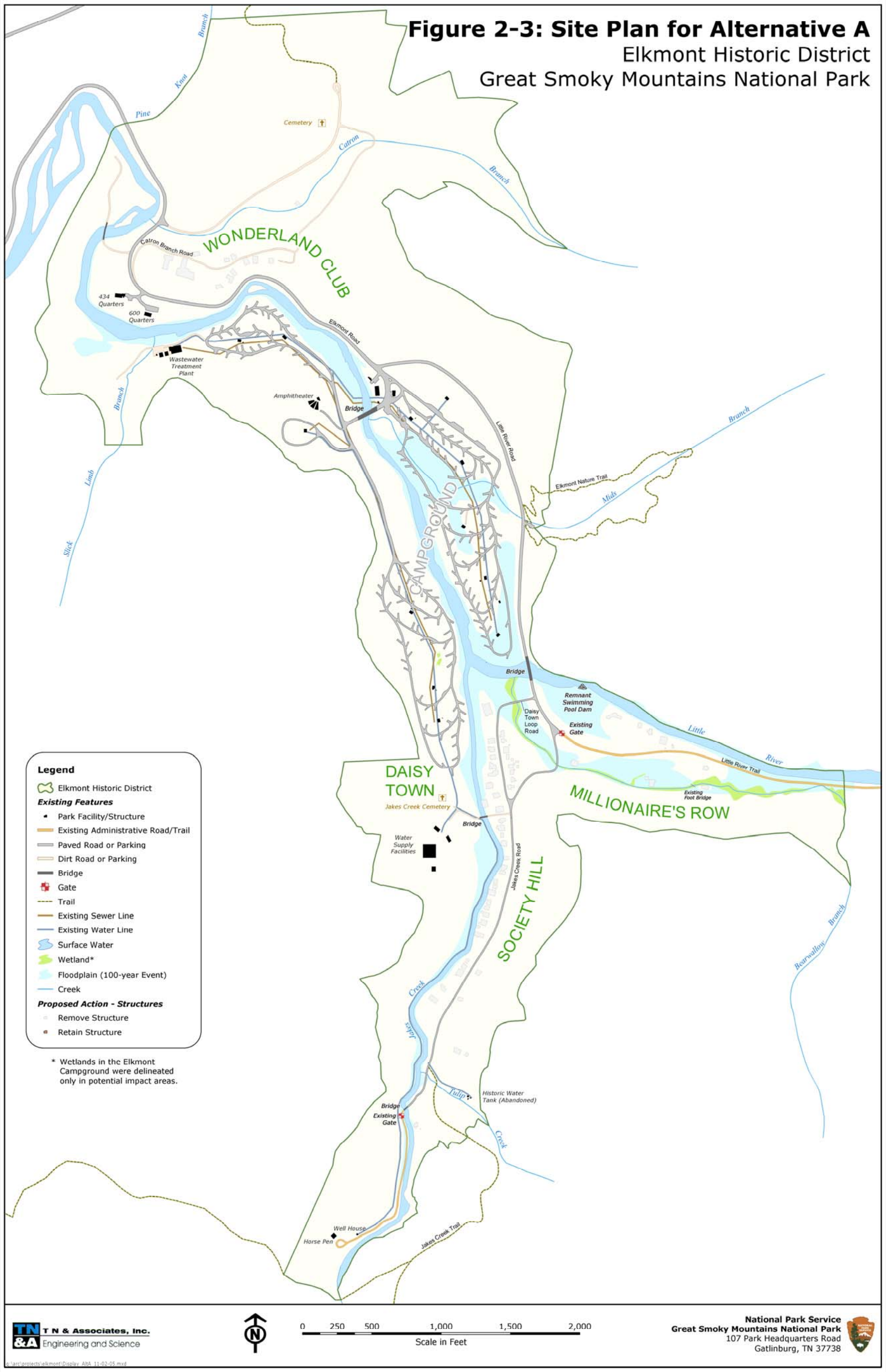
The District contains unique plant communities and natural features due to its location within and adjacent to the Little River floodplain. The river and its associated plant communities provide habitat for a variety of flora and fauna, contributing to the Park's overall biodiversity. To facilitate natural resource restoration, Alternative A calls for removal of all buildings as outlined in the 1982 General Management Plan. The proposed work would consist of either mechanical removal or removal by hand. Efforts would be made to facilitate complete removal of building foundations and stonework above ground level. Alternative A also includes some interpretive features to further educate visitors on the natural and cultural history of the District. They include a wayside exhibit at the Elkmont Campground, describing the history of the Town of Elkmont, and a wayside exhibit in the Millionaire's Row area with information on the District's synchronous firefly population. This alternative provides for active restoration and management to facilitate the reestablishment of native plant communities. As in the No Action Alternative, long–term management of invasive and/or non- native plant species would continue. However, Alternative A also proposes a more intensive effort to inventory and eradicate non- native species. Table 2- 5 provides a summary of the proposed treatment for all buildings under Alternative A. The alternative is depicted on Figure 2- 3 on the following page.

Table 2- 5: Buildings Summary for Alternative A

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	Remove	Active restoration and management of native plant communities
Annex	Remove	Active restoration and management of native plant communities
Cabins	Remove all	Active restoration and management of native plant communities
Millionaire's Row	Remove all	Active restoration and management of native plant communities
Daisy Town		
Appalachian Clubhouse	Remove	Active restoration and management of native plant communities
Cabins	Remove all	Active restoration and management of native plant communities
Society Hill	Remove all	Active restoration and management of native plant communities

Figure 2-3: Site Plan for Alternative A

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District

Existing Features

- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Gate
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek

Proposed Action - Structures

- Remove Structure
- Retain Structure

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

T N & Associates, Inc.
Engineering and Science

0 250 500 1,000 1,500 2,000
Scale in Feet

National Park Service
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, TN 37738

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2.2.3.2 Land Protection

Alternative A would provide land protection measures by being consistent with the Park's mission in preservation of natural resources and some cultural resources. Natural resources would be protected by actively restoring native plant communities at all former building sites. Although the historic buildings would be removed, some cultural landscape features, such as stone bridges and other features that would require ground disturbance in order to be removed would remain as a link to the past human occupation of the District.

2.2.3.3 Cultural Resource Management

This alternative focuses on natural resource restoration and would protect some of the cultural resources in the District by minimizing disturbance of archeological sites. Minor grading to provide a gradual transition into the elevation of the abutting topography may be required at former building sites. In those areas where ground disturbance would be required to remove foundations and other stonework, these building remnants would be left in place. Retaining these types of features and other cultural landscape components provides for cultural resource management consistent with the Park's mission. Measures to avoid potential impacts to shallow archeological deposits are described in the environmental consequences chapter of this document (Chapter 4), while Appendix E provides recommendations for specific buildings or groups of buildings.

2.2.3.4 Natural Resource Management

Alternative A proposes active restoration of native plant species in all areas disturbed during project implementation. Active restoration includes seeding and planting with native species collected in the District, followed by vegetation management. Active restoration of native plant communities would accomplish a variety of tasks including increasing species diversity, improving and increasing wildlife habitat, and providing soil stabilization measures. Management would be performed annually to prevent infiltration of non- native species and to promote the establishment of native plant communities. The need and focus of this non- native species management plan would be reassessed as conditions necessitate.

Soil disturbance, loss of tree canopy and planting of non- native species are all features of the District that would be addressed by Alternative A. Past use of the Elkmont area for farming, logging, and construction of buildings and roadways resulted in considerable disturbance of plant communities within the District over the past century. Subsequent activities such as planting of ornamental species, rerouting of Bearwallow Branch, driving or parking automobiles off of paved roadways and deposition of refuse and other materials caused additional disturbance. The "globally imperiled" montane alluvial forest plant community, which, in the past existed within the floodplain, experienced disturbance from logging and construction of the District buildings. Where appropriate conditions exist, reestablishment of plant communities in place prior to intensive human disturbance of the area would be promoted, including restoration of montane alluvial forest.

To create an environment conducive to the establishment of native plant communities in disturbed areas throughout the District, non- native species that compete with native species would be identified and eradicated. A District- wide inventory of non- native species has been completed in the past and has identified several non- native species that the NPS currently treats (see Table 2- 2 under Section 2.2). Alternative A proposes to dedicate additional funding to support management planning and staff to implement a comprehensive non- native species eradication plan throughout the District. This plan would focus on the species listed in Table 2- 2 and would be implemented on an annual basis. The goals of this management plan would be to create conditions suitable for native plant communities to thrive by reducing competition from non- native plant species; actively treat hemlock communities to protect against woolly adelgid infestation; revegetate disturbed areas with plant materials relocated from within the District to eliminate sites for potential non- native species infiltration; provide for long- term soil stabilization and erosion deterrence; and increase suitable habitat for wildlife species known to exist within the District.

In summary, this alternative focuses on protection of natural resources and ecosystems in the District. Alternative A would not generate any additional discharge from the sewage treatment plant or surface water run- off from impermeable surfaces into the Little River or its tributaries. No additional activities are proposed within the 100- year floodplain. Active restoration and long- term management of montane alluvial forest areas is proposed for sites where buildings are removed. Visitor use activities would continue at existing levels and pedestrian circulation would utilize existing roadways, also aiding in minimizing impacts to natural systems.

2.2.3.5 Interpretation and Visitor Use

According to the General Management Plan, the basic objective of interpretive efforts is to demonstrate to visitors the value of the Park as a sanctuary from some of the effects of the modern technological world and to show how the special qualities of such a sanctuary relate to and benefit people. Opportunities for hiking, picnicking, camping, fishing and viewing the Park by vehicle all exist within the District. These opportunities would continue to be available to all visitors if Alternative A was implemented.

Interpretive features would be included under Alternative A. Wayside exhibits would describe the history of the Town of Elkmont and the natural history of synchronous fireflies. The interpretive brochure currently available at the Elkmont Nature Trail would be revised to include historical information about Elkmont and would emphasize the integration of cultural and natural resource themes.

2.2.3.6 Facilities Development with Detailed Site Plans for Alternative A

Under Alternative A, all of the buildings and structures within the District associated with the Appalachian and Wonderland Clubs would be removed. Removal would be accomplished either by mechanical means or by hand removal. Foundations and buried features would not be excavated. However, they would be removed if removal can be accomplished without causing additional ground disturbance. If ground disturbance other than minimal grading would be necessary to blend former building sites into existing topography, these features would be left in place. Former building sites would

be restored with native plant seed collected in advance by the Park from within the District. Restoration of native plant communities would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas. In addition, the footings of a small footbridge over Bearwallow Branch would be repaired and the bridge surface restored as a safety measure for hikers.

Infrastructure Needs

No infrastructure improvements will be necessary to accommodate the needs of Alternative A. However, implementation of Alternative A may result in accelerated deterioration of some of the existing roadways within the District. Roadways that may require repair following project implementation are described in Section 2.2.1. Road repair work will not occur until building removal has been completed. Once necessary repairs are made, no additional operation and maintenance expenditures will be needed for these roadways over and above those funds presently budgeted for existing roadways within the District. Primary features of this alternative are summarized in Table 2- 6 below.

2.2.3.7 Estimated Development Costs

The estimated range of costs for site development and implementation of Alternative A is provided in Appendix C of this document. An itemized list of costs and post-construction operation and maintenance costs are also provided. Total costs of Alternative A are based on estimating the funds necessary to perform the following items:

- Building removal
- Infrastructure improvements
    - Existing roadway repairs
- Vegetation management / non- native species removal/ restoration
- Resource education components
- Mitigation measures to be implemented as part of the alternative

Table 2- 6: Summary of Implementation Features for Alternative A

Use of Historic Buildings	None; all historic buildings are proposed to be removed
Measures for Buildings Retained	None; all historic buildings are proposed to be removed
Natural Resources Management	Non- native species eradication and management of native plant communities would occur annually throughout the District. Continued implementation of current management activities would occur including non- native species management, hemlock management, water quality monitoring, and fish population assessment.
Visitor Use	Visitation is not expected to increase. Use would continue to consist of hiking on existing trails, camping, fishing and other compatible recreational activities.
Interpretive Features	One wayside exhibit at campground describing history of the Town of Elkmont; one wayside exhibit on synchronous fireflies; Elkmont Nature Trail brochure would be revised to include a description of the District's cultural and natural resources.
Access / Circulation	No changes to existing access or circulation are proposed
Parking	No parking improvements or changes are proposed
Utilities	No changes to existing utilities are proposed
Landscape Treatment	Remove above ground features including foundations and rock walls; retain other cultural features where they do not pose a safety hazard
Park Operations and Staffing	Stabilization of the historic buildings would be eliminated; non- native species management specialist required half- time during growing season months to perform non- native species removal and native seed and plant installation; retain the current level of general maintenance to the existing infrastructure.

2.2.4 Alternative B

2.2.4.1 Concept

Alternative B proposes to retain some of the historic buildings in the District and would provide for restoration of native plant communities in locations where buildings are removed.. The buildings proposed for restoration and preservation were selected in order to provide a contiguous representative collection of historic buildings and the associated cultural landscape in one area of the District during the period of significance.

Alternative B proposes that exhibits would be provided on the history of Elkmont and on synchronous fireflies. The Elkmont Nature Trail brochure would be updated as well. In addition, Alternative B includes a variety of interpretive features throughout the District focused on the natural and cultural resources of the Elkmont Historic District (see Table 2- 18).

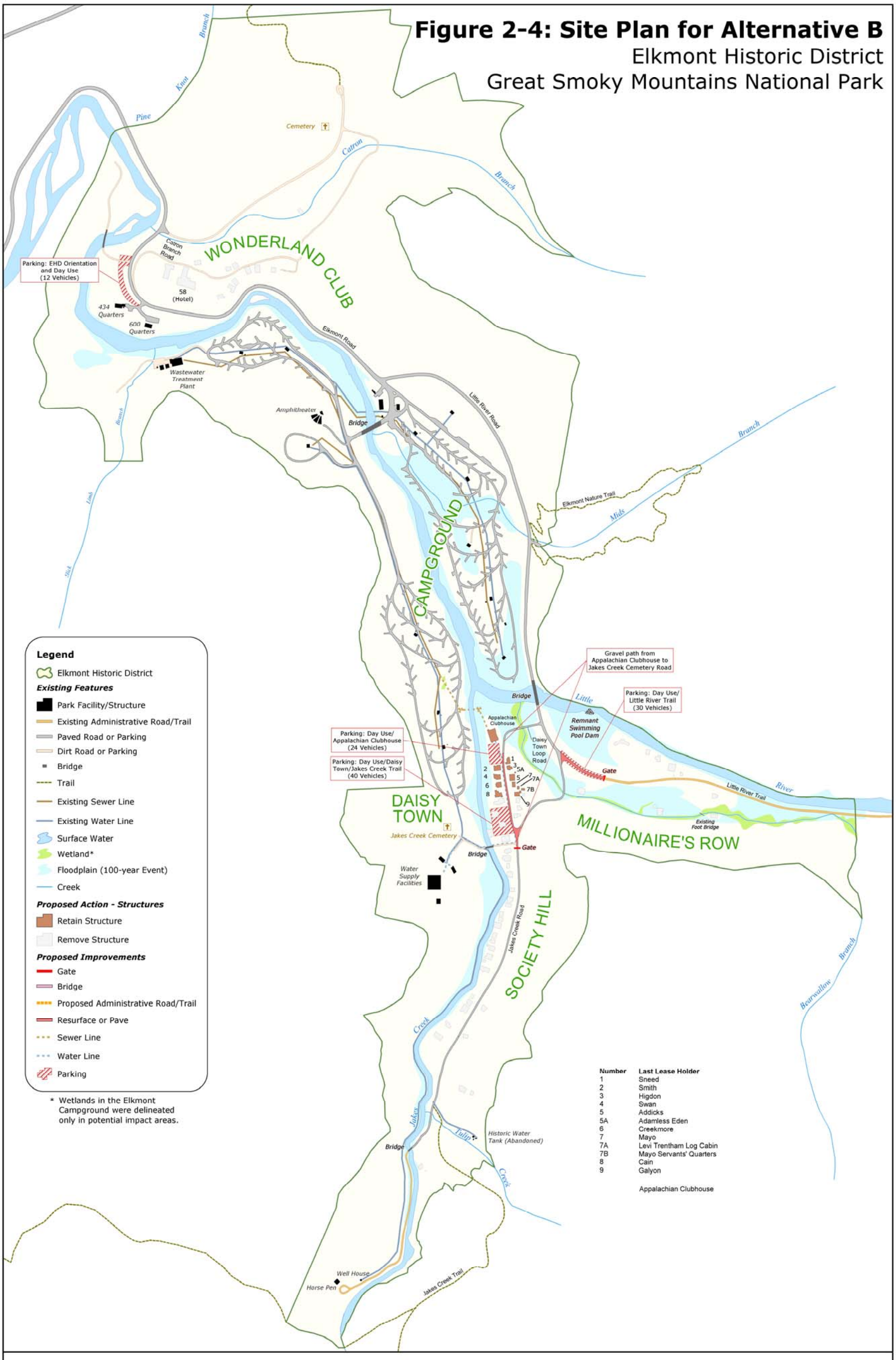
The Visitor Education focus would be interpretation of the changing landscape, the development of Elkmont, and the travel and tourism that eventually led to establishment of the Park. Table 2- 7 provides a summary of the proposed treatment for all buildings under Alternative B. The alternative is depicted on Figure 2- 4.

Table 2- 7: Buildings Summary for Alternative B

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	Remove	Restoration of native plant communities; wayside exhibits and exhibits at orientation kiosk
Annex	Remove	Restoration of native plant communities
Cabins	Remove all	Restoration of native plant communities
Millionaire's Row	Remove all	Restoration of native plant communities; wayside exhibit
Daisy Town		
Appalachian Clubhouse	Restore exterior, rehabilitate interior	Public Rental and day use; walking tour with interior self- guiding museum exhibits and wayside exhibits
Cabins	Restore 11 of the contributing cabins and return one non-contributing building to its historical configuration and preserve interiors, remove all others	Walking tour with wayside exhibits; Restoration of native plant communities where buildings are removed
Society Hill	Remove all	Restoration of native plant communities

Figure 2-4: Site Plan for Alternative B

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District

Existing Features

- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek

Proposed Action - Structures

- Retain Structure
- Remove Structure

Proposed Improvements

- Gate
- Bridge
- Proposed Administrative Road/Trail
- Resurface or Pave
- Sewer Line
- Water Line
- Parking

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

Number	Last Lease Holder
1	Sneed
2	Smith
3	Higdon
4	Swan
5	Addicks
5A	Adamless Eden
6	Creekmore
7	Mayo
7A	Levi Trentham Log Cabin
7B	Mayo Servants' Quarters
8	Cain
9	Galyon

Appalachian Clubhouse

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Engineering and Science

0 250 500 1,000 1,500 2,000
Scale in Feet

National Park Service
Great Smoky Mountains National Park
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Gatlinburg, TN 37738

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2.2.4.2 Land Protection
Alternative B would provide land protection measures by being consistent with the Park's mission to preserve cultural and natural resources. Although some of the historic buildings would be removed, Alternative B also proposes to retain a grouping of buildings for cultural resource interpretation purposes. These features would remain as a link to the past human occupation of the Appalachian and Wonderlands Clubs, while natural resources would be protected by restoring native plant species at all of the former building sites except where a parking lot is installed.

2.2.4.3 Cultural Resource Management
As noted above, Alternative B provides for cultural resource management consistent with the Park's mission by retaining and restoring a grouping of historic buildings. These buildings were selected as a representation of a contiguous cultural landscape in the Daisy Town part of the District. Where buildings are removed, stone walls and foundations would be left in place for interpretive purposes.

The gravel walking path extending from the Appalachian Clubhouse to Jakes Creek Cemetery would be restored. This path was originally developed as a boardwalk, but was later replaced with compacted gravel during the period of significance. Currently, although the historic location of this pathway remains visible, it is not actively maintained. Gravel will be placed over the existing path, extending from the Appalachian Clubhouse south to the road to Jakes Creek cemetery. This path would provide for separation of pedestrian and vehicular traffic.

Alternative B would protect and perpetuate cultural resources through preservation and restoration of a representative collection of buildings and the associated cultural landscape in one area of the District. Stonework and foundations would be retained at some sites where buildings are removed. Measures to avoid potential impacts to shallow archeological deposits would be used and are described in Section 2.1.1 of this document. Appendix E provides measures and recommendations for impact avoidance at specific buildings, or groups of buildings and other areas where modifications are proposed.

2.2.4.4 Natural Resource Management
Past use of the Elkmont area for private and commercial logging operations significantly disturbed plant communities within the District. Subsequent construction within the District and activities such as planting ornamental species, rerouting Bearwallow Branch, driving and parking off paved roadways, and deposition of refuse and other materials, caused additional disturbance.

Alternative B proposes restoration of native plant communities in all areas disturbed during project implementation with plants propagated from native seed sources and salvaged plants collected within the District. Plant materials could be transplanted from locations within the District to accomplish a variety of activities, including revegetation where buildings are proposed to be removed and creation of a visual barrier between the parking area and Quarters 434 and 600. Active restoration of native plant communities would accomplish a variety of tasks including increasing species diversity, improving and

increasing wildlife habitat, and providing soil stabilization measures. Although some buildings would be retained under this alternative, the majority would be removed, allowing for reestablishment of plant communities where buildings and other structures are removed. Current natural resource management practices concentrating on removal of non- native species, treatment of hemlock woolly adelgid infestations, and other monitoring activities would continue at their current level.

Alternative B would protect and perpetuate natural resources and ecosystems. This alternative would not generate any additional discharge from the sewage treatment plant or runoff into the Little River or its tributaries as a result of land use or visitor activities. No additional activities within the 100- year floodplain are proposed. Visitor use activities would continue at existing levels and would aid in minimizing impacts to natural systems. Defined and delineated parking for day use visitors and for trailheads would prevent and minimize uncontrolled site impacts by providing adequate space for vehicles in designated parking areas.

2.2.4.5 Interpretation and Visitor Use
According to the General Management Plan, the basic objective of the interpretive effort is to demonstrate to visitors the value of the Park as a sanctuary from some of the effects of the modern technological world and how the special qualities of such a sanctuary relate to and benefit people.

Under this alternative, interpretive features, such as wayside exhibits or other resource education components, would be included to facilitate an understanding of the history of the District from cultural and natural resource viewpoints (see Table 2- 18). Opportunities for interpretation of plant communities, specifically in terms of natural succession and forest recovery, would be provided. Alternative B would provide visitors with opportunities to learn about Elkmont's human occupation through interpretive exhibits, retention of cultural landscape features, and restoration and rehabilitation of the Appalachian Clubhouse along with a grouping of cabins retained in Daisy Town. The interior of the Clubhouse would be rehabilitated to allow for day use activities. In addition, interior exhibits would be installed in the Clubhouse, which would serve as a self- guiding museum. Wayside exhibits would also be installed adjacent to the Clubhouse.

2.2.4.6 Facilities Development with Detailed Site Plans for Alternative B
Under Alternative B, twelve cabins/buildings would be restored on the exterior and preserved on the interior. The Appalachian Clubhouse would be restored on the exterior and rehabilitated on the interior to serve as a public day use rental facility and self-guiding museum. All of the remaining historic buildings would be removed either by mechanical means or by hand removal. Foundations and buried features would not be excavated. Following removal, former building sites would be restored with native plant species from seed and other plant materials collected from within the District. Restoration of native plant communities would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas. Details of this alternative are provided below and summarized in Tables 2- 8 and 2- 17 to 2- 23.

Specific project implementation requirements for Alternative B include:

Water

Currently, the average number of day use visitors to the District is approximately 500. Peak visitation is experienced during the months of July and October and ranges from 900 to 1000 visitors per day. Visitors utilize Little River Road as access for day use within the District, to trails leading out of the District, and to the 220- site Elkmont Campground. Under Alternative B, visitation is not expected to increase significantly; however, day users and other visitors will have access to new facilities. Specifically, additional water will be required to accommodate day use facilities and the public restroom that will be provided at the Appalachian Clubhouse.

Peak daily water supply needs are based on the volume of wastewater generated by the plumbing fixtures associated with proposed improvements (Table 2- 20). However, in order to accurately estimate the total volume of potable water that must be produced to generate the volume of wastewater anticipated, the amount of water that is typically lost (or unaccounted for) within the water distribution system must also be included in the projected demand. Based on information collected previously by the NPS comparing the volume of potable water processed and the wastewater discharged at the wastewater treatment facility, the water system at Elkmont typically provides 25 percent more water than the amount that reaches the wastewater plant. In many water systems, the balance of this water may generally be lost to leakage in the system, drinking and cooking, lawn and landscape irrigation, watering animals, and other uses that bypass the wastewater system. This difference is used in combination with wastewater projections to forecast water demand for the project alternatives. Estimates of the water supply and wastewater system needs anticipated under this alternative have been developed assuming the use of low flow plumbing fixtures and are provided below:

Average visits per day to the Appalachian Clubhouse restrooms	500
Wastewater generated per visit	2.6 gallons
Wastewater generated	1,300 gallons per day (gpd)
25 percent lost in system	325 gpd
Total water supply needs	1,625 gpd

Based on wastewater projections for this alternative, water demand is therefore increased by approximately 25 percent to arrive at a volume of 1,625 gallons of potable water required per day.

In order to meet state building codes, the day use facility in this alternative would be equipped with a fire suppression (sprinkler) system meeting the National Fire Protection Act (NFPA) 13R standard. The water supply system provided for this alternative must also be capable of meeting that requirement. The water demands for fire suppression equipment vary from building to building. According to NFPA 13R, fire suppression systems should be designed to confine a fire to a single compartment (room) of a single building. Therefore, the capacity and design of this system varies based on the size of

each room in each building. One sprinkler head must be provided for every 144 square feet of a compartment or part thereof. This system must discharge at least 18 gallons per minute to an individual sprinkler head or 13 gallons per minute per sprinkler head simultaneously to all of the sprinklers within the compartment. For large compartments (greater than 576 square feet) the maximum number of sprinkler heads considered in a design shall be four (4). This system must be capable of providing this flow for a minimum of 30 minutes. Under Alternative B, two sprinkler heads would be provided in the food preparation area of the Appalachian Clubhouse. The total capacity required by the fire suppression system is 780 gallons over a 30- minute period (2 sprinkler heads x 13 gallons per minute x 30 minutes).

Improvements to the water supply system proposed for Alternative B are based on the projected needs described above. These improvements include installation of a water line from the existing water supply line feeding the Elkmont Campground to the Appalachian Clubhouse to meet day use and restroom facility water needs and to provide enough capacity to fulfill the requirements for the fire suppression system over the food preparation area. The location and specifications of the recommended water supply improvements are listed in Table 2- 21 at the end of this chapter.

Wastewater

Sewer service will also be required to accommodate the proposed restroom facilities and day use in the Appalachian Clubhouse. Wastewater service for these improvements is described above and is calculated at 1,300 gallons per day. The required improvements are listed in Table 2- 22.

Roads

The average day use visitation to the District is estimated at 500 visitors per day under Alternative B. With an average of 2.8 visitors per car, approximately 179 cars per day would visit the District. The majority of these visits would be short- term, and the visits would generally be spaced uniformly throughout the day. For an eight- hour day, projected traffic counts are expected to be approximately 22 cars per hour. To provide access to the restored cabins and exhibits proposed under this alternative, roadway repairs and resurfacing of Daisy Town Loop Road would be required. Increased vehicular traffic in Daisy Town could also result in conflicts between pedestrian and vehicular traffic, creating a need to better control traffic patterns.

The proposed restoration of a group of buildings at Daisy Town and installation of exhibits to be placed throughout the District is not expected to cause an increase in visitation; however, the internal circulation of visitors is expected to increase as visitors access new exhibits and other features. Roadway and walkway improvements must be implemented to facilitate safe viewing of the exhibits. Existing traffic and current lack of adequate parking necessitates that improvements be made to the existing roadway system in the Millionaire's Row/Little River Trailhead area, particularly to accommodate visitor parking from Daisy Town that may overflow into the Little River parking area. These proposed improvements would facilitate improved vehicular movement in the area, expand the capacity of the roadway in proximity to the Little River Trailhead, and provide improved access to the proposed exhibits and walking tour.

Other roadway improvements are needed in the Wonderland Club where the proposed orientation kiosk and related exhibits are to be installed. In several areas of the District where existing roadways cross small waterways flowing through storm drain culverts, erosion of the roadway and culvert embankments has occurred. To preserve the integrity of the roadways at these locations and to prevent further erosion, it would be necessary to stabilize the stream banks. These culverts include Tulip Creek at Jakes Creek Road, Bearwallow Branch at Jakes Creek Road and Daisy Town Loop Road, Mids Branch at Little River Road, and Catron Branch at Elkmont Road. In addition, the existing stone steps in front of the Wonderland Hotel are irregular in shape and spacing, making them hazardous to use. For the safety of visitors, the steps may be closed to the public with a restrictive barrier that is capable of preventing pedestrians from utilizing the stairs. Proposed roadway improvements for Alternative B are based on the needs described above to facilitate safe vehicular and pedestrian access to exhibits and trailheads within the District. Proposed roadway improvements are listed in Table 2- 23.

Parking and Access

Although average daily visitation is not expected to increase under this alternative, the number of internal trips within the District to visit exhibits and other features would require additional parking accommodations. These parking accommodations would also help to facilitate improved pedestrian access/movement to the destinations proposed by this alternative. Alternative B proposes three (3) primary destinations within the District: the Wonderland Club orientation kiosk; Millionaire's Row/Elkmont Nature Trail and the Daisy Town cabins and exhibits; and the day use exhibits and self-guiding museum at the Appalachian Clubhouse.

The parking required for casual day visitors is in addition to the estimated number of visitors who use the hiking trails leading away from the District. As previously stated, projected traffic counts for casual day visitors are estimated at approximately 22 cars per hour. Current estimates place approximately 30 vehicles per hour at both the Little River and Jakes Creek trailheads (NPS 2002a). An additional parking lot would be necessary at the Appalachian Clubhouse to accommodate day use vehicles. The existing parking area adjacent to the Clubhouse can accommodate up to 24 vehicles, which would be dedicated to day use functions under special use permit. Although day use of the Appalachian Clubhouse most likely will not occur every day, the proposed parking for the entire District must be sufficient to accommodate the maximum projected number of vehicles that will be in the District at any given time.

Therefore, in addition to paving the Appalachian Clubhouse parking area, the need for 82 parking spaces (30 at each trailhead plus 22 day use visitors) will be fulfilled by construction of the District Orientation Parking Area across the road from the former Wonderland Hotel (12 spaces); construction of Daisy Town/Jakes Creek Trailhead Parking in a location where non- contributing buildings are proposed to be removed (40 spaces); and construction of "pull in" parking at the Little River Trailhead at Millionaire's Row (30 spaces). Parking will be more concentrated in designated parking areas than the existing situation, in which parking is dispersed throughout the District.

The parking lots will be paved with pervious pavement to reduce the quantity of runoff from the paved area while eliminating the potential for rutting and soil erosion.

To provide access for parking at the Little River Trailhead, a gate would be relocated from its current location on Little River Road to the east end of the Little River Trailhead parking area. A walking path from the parking area at the Little River Trailhead to the exhibits would also be constructed. A gate on Jakes Creek Road would be relocated from its existing location near the bridge over Jakes Creek to just south of Jakes Creek Cemetery Road. The new parking area in Daisy Town would not only serve hikers utilizing Jakes Creek Trail, but also visitors that would like to walk through Daisy Town to see the restored buildings, the new exhibits, and the cemetery.

Other requirements for Alternative B include:

- The entrance to the orientation kiosk and parking area is located near a curve in the roadway, which limits site distance. As a safety measure, signs would be installed on Elkmont Road to alert drivers to the upcoming entrance to the parking area. The intersection and the parking area would be illuminated at night.
- Provide a visual screen utilizing plant materials relocated from other areas in the District for all proposed parking areas to minimize the visual intrusion of the parking areas into the cultural landscape.
- Repair the footings of a small footbridge over Bearwallow Branch and restore the surface as a safety measure for pedestrians.

Implementation of Alternative B may also result in damage to the existing roadways from heavy machinery traffic during project implementation. The roadways that may require repairs are described in Section 2.2.1. Primary features of this alternative are summarized in Table 2- 8 on the following page.

2.2.4.7 Estimated Development Costs

The estimated range of costs for site development and implementation of Alternative B is provided in Appendix C of this document. An itemized list of costs and post-construction operation and maintenance costs are also provided. Total costs of Alternative B are based on estimating the funds necessary to perform the following items:

- Building removal, restoration, rehabilitation and preservation
- Infrastructure improvements
    - Parking lots (improvements and new lots)
    - Road system improvements
    - Water supply system improvements
    - Wastewater system improvements
- Vegetation management
- Resource education components
- Mitigation measures to be implemented as part of the alternative
- Resource and visitor protection patrols

Table 2- 8: Summary of Implementation Features for Alternative B

Use of Historic Buildings	12 cabins / buildings and the Appalachian Club retained; remainder removed
Measures for Buildings Retained	Restore exterior in accordance with *The Secretary of Interior's Standards*; preserve interior of cabins; restore exterior of Appalachian Clubhouse and rehabilitate interior to allow for public rental and day use
Natural Resources Management	Continued implementation of current management activities including hemlock pest management, water quality monitoring, fish population assessment; and revegetation of former building sites
Visitor Use	Visitation is not expected to change significantly. Use of existing hiking trails, camping, fishing and other compatible recreational activities would continue. Interpretation of the retained Daisy Town cabin community, day use, and self- guiding museum in the Appalachian Clubhouse would provide for an experience currently not available at the District.
Interpretive Features	Orientation kiosk and brochure across from former hotel site on Elkmont Road; revision of the Elkmont Nature Trail brochure to include natural resource information; 8 wayside exhibits; interior exhibits in the Appalachian Clubhouse for use as a self- guiding museum
Access / Circulation	• Relocate gate on Little River Road to east end of Little River trailhead parking area • Relocate existing gate or install new gate at the beginning of Jakes Creek Road • Place gravel over existing path in Daisy Town from Appalachian Clubhouse to road to Jakes Creek cemetery • Little River trailhead paving- 350 lf • Daisy Town loop paving- 1,111 lf • Orientation parking area road - 400 lf • Walking path from Orientation parking area
Parking	4 parking areas proposed
Utilities	Add public restroom facility available from outside and inside for day users of the Appalachian Clubhouse and add sprinkler system for fire suppression. Also includes: Water Line: 1,300 lf to Appalachian Clubhouse Wastewater System: 640 lf gravity sewer line from Appalachian Clubhouse
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	Implementation of this alternative would eliminate the need for those resources currently being utilized to stabilize historic buildings removed under this alternative; however, operation and maintenance costs would be required to maintain the infrastructure and the buildings retained and to process special use permits.

2.2.5 Alternative C
The Environmentally Preferred and Agency Preferred Alternative

2.2.5.1 Concept

This alternative would allow for cultural resource preservation through exterior restoration of most of the buildings in Daisy Town and the Chapman Cabin in Society Hill. As in Alternative A, exhibits would be provided about the history of the Town of Elkmont and natural history of synchronous fireflies. The Elkmont Nature Trail brochure would be updated to include a description of the montane alluvial forest and other important natural resources of the District. In addition to exhibits provided in Alternative A, Alternative C proposes to include a variety of other interpretive features in the Wonderland Club, in Daisy Town and at the Appalachian Clubhouse (Table 2- 18).

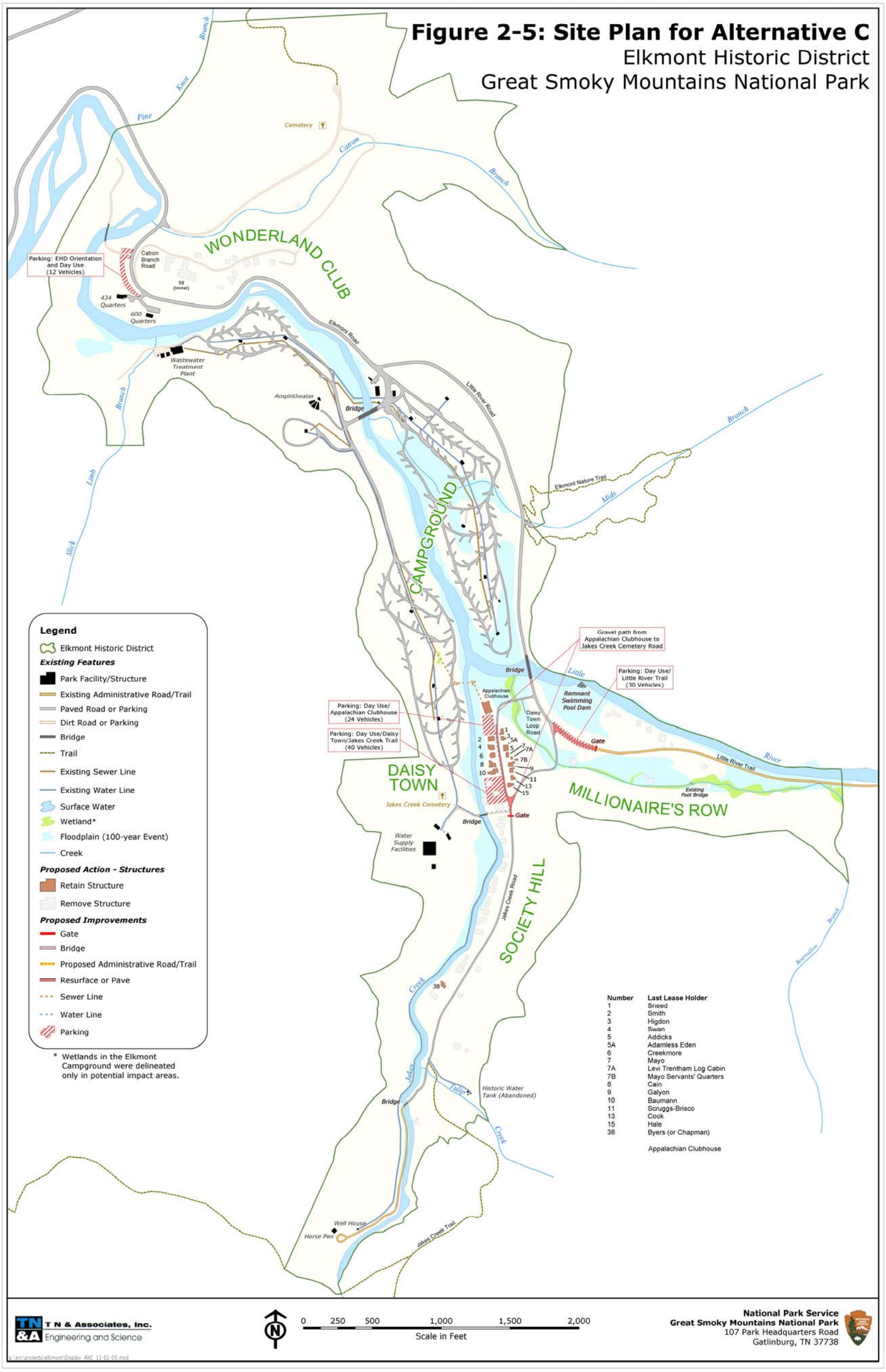
The Visitor Education focus would be interpretation of the changing landscape, the development of Elkmont, and the travel and tourism that eventually led to establishment of the Park. Restored buildings would provide the sense of community and spatial relationships in sections of the District. Natural regeneration of the forested areas would take place in the remaining areas of the District, including the floodplain along the Little River where the montane alluvial forest habitat exists. Table 2- 9 provides a summary of the proposed treatment for all buildings under Alternative C. The alternative is depicted on Figure 2- 5 on the following page.

Table 2- 9: Buildings Summary for Alternative C

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	Remove	Wayside exhibit at former hotel site; kiosk on west side of Elkmont Road with self- guiding brochure
Annex	Remove	Restoration of native plant communities
Cabins	Remove all	Restoration of native plant communities
Millionaire's Row	Remove all	Restoration of native plant communities; wayside exhibit
Daisy Town		
Appalachian Clubhouse	Restore exterior, rehabilitate interior for day use	Public Rental and day use; walking tour with interior self- guiding museum exhibits and wayside exhibits
Cabins	Restore exteriors of all 15 contributing cabins and return one non-contributing building to its historical configuration; preserve interiors	Walking tour with wayside exhibits; Restoration of native plant communities where buildings are removed
Society Hill	Restore exterior of Chapman cabin, remove all others	Exhibit and walking tour Restoration of native plant communities

Figure 2-5: Site Plan for Alternative C

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District

Existing Features

- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek

Proposed Action - Structures

- Retain Structure
- Remove Structure

Proposed Improvements

- Gate
- Bridge
- Proposed Administrative Road/Trail
- Resurface or Pave
- Sewer Line
- Water Line
- Parking

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

Number	Last Lease Holder
1	Sneed
2	Smith
3	Higdon
4	Swan
5	Addicks
5A	Adamless Eden
6	Creekmore
7	Mayo
7A	Levi Trentham Log Cabin
7B	Mayo Servants' Quarters
8	Cain
9	Galyon
10	Baumann
11	Scruggs-Brisco
13	Cook
15	Hale
38	Byers (or Chapman)

Appalachian Clubhouse

T N & Associates, Inc.
Engineering and Science

0 250 500 1,000 1,500 2,000
Scale in Feet

National Park Service
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, TN 37738

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Alternative C provides for retention of buildings in Daisy Town, as well as the Chapman cabin on Society Hill, both of which would be used for cultural resource interpretation. The interpretive cluster at the Appalachian Club would include the Clubhouse building plus 16 cabins that are in close proximity and form a distinct cultural landscape. Forest restoration and regeneration would occur where cabins are removed. Protection of natural resources would be provided at additional locations due to a decrease in the size of developed areas.

Alternative C is the Environmentally Preferred Alternative because it retains buildings, structures and component landscapes in clusters and associations sufficient to provide a sense of character in a core area of the District while allowing for natural regeneration of native plant communities in remaining areas where buildings would be removed. In addition, this alternative would provide multiple opportunities for natural and cultural resource interpretation throughout all areas of the District as well.

2.2.5.2 Land Protection

Alternative C would provide land protection measures by being consistent with the Park's mission to preserve cultural and natural resources. Although some of the historic buildings would be removed, Alternative C also proposes to retain a grouping of buildings and components of the cultural landscape for interpretation purposes. These features would remain as a link to the past human occupation of the District, while natural resources would be protected by allowing for natural revegetation of all of the former building sites except where a parking lot is installed.

2.2.5.3 Cultural Resource Management

Alternative C provides for cultural resource management by preserving the core of the resort community at the Appalachian Club (Daisy Town) and the majority of Elkmont's cultural landscape features. It also provides a variety of opportunities for interpretation of Elkmont's cultural resources. Where buildings are removed, stone walls and foundations would be left in place. This alternative would also incorporate interpretive wayside exhibits that focus on natural history and the range of Elkmont's human history, including the logging history of the area and the construction of the railroad that led to the establishment of the Town of Elkmont.

Alternative C proposes preservation of the Daisy Town portion of the Appalachian Club. Daisy Town is the oldest vacation area of Elkmont and began the club- town boom there. The proximity of the Daisy Town cabins to the clubhouse building and the presence of landscape elements such as stone walls and walkways provide the best opportunity to demonstrate to visitors how this resort community evolved and functioned. The front porches, and the close setback of most cabins to the road and walkway in Daisy Town, create a visual order that strongly suggests the community structure in this portion of Elkmont. The density of buildings and continuous streetscape characteristics, such as border walls and pathways, are complete in Daisy Town in contrast to other areas of Elkmont where the streetscape and building lines are broken, incomplete or entirely absent. Daisy Town also preserves a representative cross section of the various construction techniques and building materials present in the Elkmont Historic District,

including the only "set- off" cabins in the Park. Set- off cabins were a type of prefabricated housing employing modules that could be loaded on a flatcar. The modules were off- loaded at Elkmont and assembled into houses.

Because Daisy Town evokes a strong sense of community, this area of Elkmont offers the best opportunity for visitors to understand the former vacation community and the broad cultural pattern of second- home vacation cabins in the Southern Appalachians during the early 20th century. This alternative also includes the Chapman cabin in Society Hill, a building associated with Colonel David Chapman who was influential in the establishment of Great Smoky Mountains National Park.

Alternative C would retain the historic swimming hole at Little River as well as most of the landscape elements, such as walls and other small- scale features throughout the Elkmont community. The gravel walking path extending from the Appalachian Clubhouse to Jakes Creek Cemetery would be restored. This path was originally developed as a boardwalk, but was later replaced with compacted gravel during the period of significance. Although the historic location of this pathway remains visible, it is not actively maintained. This path would continue to provide separation of pedestrian and vehicular traffic.

Alternative C would protect and preserve Elkmont's cultural resources through the retention and interpretation of a representative collection of buildings and the associated cultural landscape in a core area of the District. The preservation of the Chapman Cabin (#38) would provide opportunities to convey the history of an important figure in Elkmont's past. This alternative would retain the maximum number of Elkmont's cultural landscape features, such as stonework and foundations where buildings are removed. Combined with interpretive media, especially waysides, Alternative C will allow visitors to gain an understanding of the scope of the Elkmont vacation community and how it functioned in its heyday. Measures to avoid potential impacts to shallow archeological deposits would be used and are described in Section 2.1.1 of this document. Appendix E provides recommendations for specific buildings, or groups of buildings, and other areas where modifications are proposed.

2.2.5.4 Natural Resource Management

Although some buildings would be retained under this alternative, the majority would be removed, allowing for reestablishment of plant communities where buildings and other structures are removed. Alternative C proposes restoration of all areas disturbed during project implementation and would include planting native plant communities with vegetation propagated from native seed sources and salvaged plants collected from within the District. Other plant materials could be transplanted from locations within the District to accomplish a variety of activities including restoration of the former building sites and creation of visual buffers between the parking area and Quarters 434 and 600. Active restoration of native plant communities would accomplish a variety of tasks including increasing species diversity, improving and increasing wildlife habitat, and would provide soil stabilization measures. Current natural resource management practices concentrating on removal of non- native species, treatment of hemlock woolly

adelgid infestations, and other monitoring activities would continue at their current level.

Alternative C would not generate additional discharge from the sewage treatment plant or runoff into the Little River or its tributaries as a result of land use or visitor activities. No additional activities within the 100- year floodplain are proposed. A low level of visitor use is proposed that would aid in minimizing impacts to natural systems. Defined and delineated parking for day use visitors and for trailheads would prevent and minimize uncontrolled site impacts by providing adequate space for vehicles in designated parking areas.

2.2.5.5 Interpretation and Visitor Use

Alternative C proposes to include interpretive features, such as buildings, cultural landscape components, exhibits and other resource education components. This alternative would also include displays and brochures that focus on cultural history, natural history, architecture, the logging history of the area, construction of the railroad, and eventual establishment of the Town of Elkmont. A wayside exhibit providing an historical perspective on Colonel Chapman's role in establishing Great Smoky Mountains National Park would also be developed.

Alternative C would restore a representative collection of buildings in one area of the District to provide a sense of its character and community. Retaining some landscape features such as stonework and foundations would provide opportunities for interpretation of sites where buildings are removed. Alternative C would provide visitors with opportunities to learn about Elkmont's human occupation through interpretive exhibits and restoration of buildings and the associated cultural landscape in Daisy Town. The Appalachian Clubhouse would be used as a self- guiding museum and for public rental and day use. The Chapman cabin would be restored on the exterior and preserved on the interior to aid in telling the story of the Park's establishment. In areas where buildings are removed, educational opportunities related to the natural regeneration of native plant communities would be provided.

2.2.5.6 Facilities Development with Detailed Site Plans for Alternative C

Under Alternative C, a total of 18 buildings and the associated landscape, consisting of 16 cabins/buildings in Daisy Town, the Chapman cabin and the Appalachian Clubhouse, would be restored on the exterior. The cabins in Daisy Town and the Chapman cabin would be preserved on the interior. The Appalachian Clubhouse would be rehabilitated on the interior and exhibits would be installed. The Clubhouse would serve as a self-guiding museum and would also be available for reserved day use through special use permit. All of the remaining historic buildings would be removed. Removal would be accomplished either by mechanical means or by hand removal. Foundations and buried features would not be excavated. Following removal, former building sites would be restored with native plant species from the District. Restoration would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas. Details of this alternative are summarized below.

Specific project implementation requirements for Alternative C include:
Alternative C includes all the infrastructure requirements for roadways, water supply, wastewater treatment, and parking and access described previously for Alternative B. As is described in Alternative B, the existing stairway to the Wonderland Hotel is in a state of disrepair and does not meet the standards of current building codes. As a safety measure, a barrier would be installed to prevent pedestrian access to the steps. An alternate pathway up the hill would be constructed to gain access to the exhibits at the former hotel site. Alternative C also includes additional wayside exhibits at the Wonderland Hotel site and at the Chapman cabin in Society Hill. Repair of a portion of Jakes Creek Road to provide a stable walking surface would also be required.

Other requirements for Alternative C include:

- The entrance to the orientation kiosk and parking area is located near a curve in the roadway with limited sight distance. As a safety measure, signs would be installed on Elkmont Road to alert drivers to the parking area entrance.
- Provide a visual screen utilizing plant materials relocated from other areas in the District for all proposed parking areas to minimize the visual intrusion of the parking areas into the cultural landscape.
- Repair footings of a small footbridge over Bearwallow Branch and restore the surface as a safety measure for pedestrians

Implementation of Alternative C may also result in damage to the existing roadways from heavy machinery and truck traffic during project implementation. Roadways which would require repair following project implementation are discussed in Section 2.1.1 of this document. Increased internal vehicular traffic would result in the need for an incremental increase in the operations and maintenance budget for the roadways affected by this alternative. These roadways include Elkmont Road, Little River Road, Jakes Creek Road and Daisy Town Loop Road and their associated parking areas. Primary features of this alternative are summarized in Table 2- 10.

2.2.5.7 Estimated Development Costs

The estimated range of costs for site development and implementation of Alternative C is provided in Appendix C of this document, including an itemized list of project implementation costs and post- construction operation and maintenance costs. Total costs of Alternative C are based on estimating the funds necessary to perform the following items:

- Building removal, rehabilitation, restoration and preservation
- Infrastructure improvements
    - Parking lots (improvements and new lots)
    - Road system improvements
    - Water system improvements
    - Wastewater system improvements
- Vegetation management
- Resource education components
- Mitigation measures to be implemented as part of the alternative
- Resource /visitor protection patrols

Table 2- 10: Summary of Implementation Features for Alternative C

Use of Historic Buildings	16 buildings in Daisy Town, the Chapman cabin in Society Hill and the Appalachian Club retained; Wonderland Hotel and remainder of historic buildings proposed to be removed
Measures for Buildings Retained	All work would be conducted in accordance with *The Secretary's Treatment Standards*; restore exteriors and preserve interiors of cabins; restore exterior of Appalachian Clubhouse and rehabilitate interior to provide for public rental and day use
Natural Resources Management	Continued implementation of current management activities including hemlock pest management, water quality monitoring, fish population assessment; and revegetation of areas where buildings have been removed
Visitor Use	Visitation is not expected to increase significantly. Use of existing hiking trails, camping, fishing and other compatible recreational activities would continue along with a walking tour to view exhibits and restored buildings. Day use of the Appalachian Club would be permitted.
Interpretive Features	Up to 10 interpretive exhibits would be installed throughout the District focusing on natural and cultural resources, history of Elkmont, and history of Park establishment and the role of Colonel Chapman in its establishment. Elkmont Nature Trail brochure would be revised to discuss important natural resources; kiosk would be placed in the orientation area with introduction and history of District; interior exhibits would be installed in Appalachian Clubhouse to serve as self- guiding museum
Access / Circulation	• Relocate gate on Little River Road to east end of Little River trailhead parking area • Relocate existing gate or install new gate at the beginning of Jakes Creek Road • Resurface gravel walking path in Daisy Town from Appalachian Clubhouse to road to Jakes Creek cemetery • Little River trailhead paving- 350 lf • Daisy Town loop paving- 1,111 lf • Orientation parking area road - 400 lf • Walking path from Orientation parking lot leading along Elkmont Road to base of Wonderland steps - 550 lf • Path on west side of Wonderland steps to the top of the steps- 400 lf
Parking	4 parking areas proposed
Utilities	Add public restroom facility and sprinkler system to the day use area of the Appalachian Club. Also includes: Water Line: 1,300 lf to Appalachian Clubhouse Wastewater System: 640 lf gravity sewer line from Appalachian Clubhouse
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	Implementation of this alternative would eliminate the need for those resources currently being used to stabilize historic buildings removed under this alternative; however, operation and maintenance costs would be required to maintain the infrastructure and the buildings retained and to process special use permits. General maintenance to existing infrastructure would continue.

2.2.6 Alternative D

2.2.6.1 Concept

Alternative D addresses Park administrative needs by providing curatorial storage and supplying temporary housing for visiting scientists in one area of the District. This alternative also expands educational and day use opportunities. Under Alternative D, sixteen (16) cabins/buildings in Daisy Town, the Chapman cabin (#38) in Society Hill, the Spence cabin (#42) in Millionaire's Row, six cabins in the Wonderland Club and the Appalachian Clubhouse would be restored. Where buildings are removed, stone walls and foundations would be left in place for interpretive purposes.

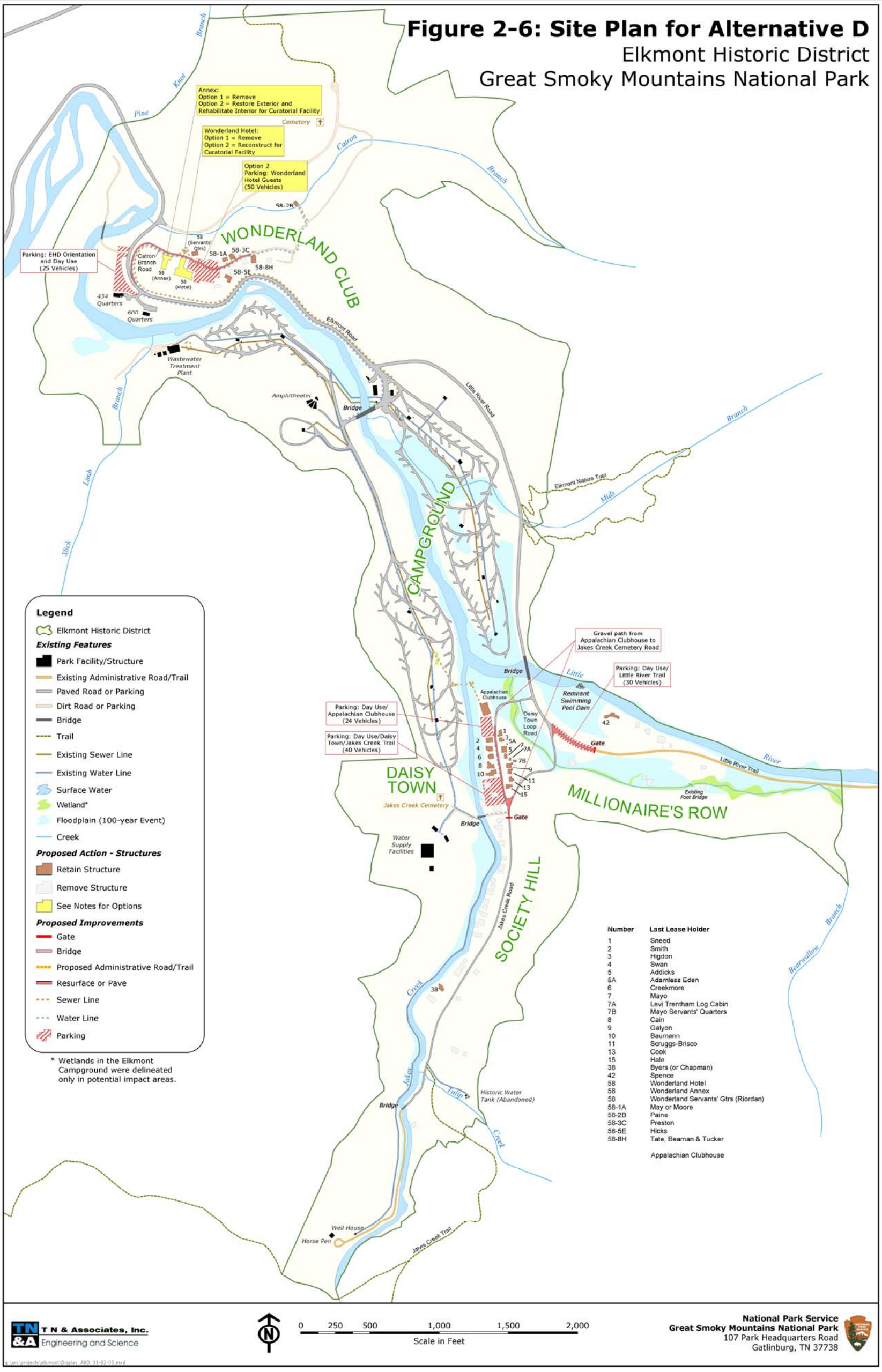
Two options for the Wonderland Hotel and Annex are proposed for this alternative. The first option (D1) includes removal of both buildings. The second option (D2) calls for reconstruction of the hotel and rehabilitation of the Annex for the Park to use as curatorial storage. All of the remaining historic buildings would be removed and forest restoration would occur at the former building sites. Resource education opportunities focused on cultural and natural history would be provided at the Appalachian Clubhouse by the NPS for the visiting public. Table 2- 11 provides a summary of the proposed treatment for all buildings under Alternative D. The alternative is depicted on Figure 2- 6 on the following page.

Table 2- 11: Buildings Summary for Alternative D

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	D1: Remove D2: Reconstruct to 1928 footprint	D1: Wayside exhibits; restoration of native plant communities D2: Curatorial storage; wayside exhibits
Annex	D1: Remove if Wonderland Hotel is removed; D2: Restore exterior and rehabilitate interior if Wonderland Hotel is reconstructed	D1: Restoration of native plant communities D2: Curatorial storage if Wonderland Hotel is reconstructed
Cabins	Restore 6 contributing cabins	Visiting scientist housing
Millionaire's Row	Restore Spence cabin; remove all others	Wayside exhibits Restoration of native plant communities
Daisy Town		
Appalachian Clubhouse	Restore exterior, rehabilitate interior for day use	Public rental and day use; walking tour with interior self- guiding museum exhibits and wayside exhibits; NPS staff- led programs
Cabins	Restore all (15) contributing cabins and return one non-contributing building to its historical configuration	Wayside exhibits and walking tour
Society Hill	Restore exterior of Chapman cabin, remove all others	Wayside exhibit and walking tour Restoration of native plant communities

Figure 2-6: Site Plan for Alternative D

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District

Existing Features

- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek

Proposed Action - Structures

- Retain Structure
- Remove Structure
- See Notes for Options

Proposed Improvements

- Gate
- Bridge
- Proposed Administrative Road/Trail
- Resurface or Pave
- Sewer Line
- Water Line
- Parking

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

Number	Last Lease Holder
1	Sneed
2	Smith
3	Higdon
4	Swan
5	Addicks
5A	Adamless Eden
6	Creekmore
7	Mayo
7A	Levi Trentham Log Cabin
7B	Mayo Servants' Quarters
8	Cain
9	Galyon
10	Baumann
11	Scruggs-Brisco
13	Cook
15	Hale
38	Byers (or Chapman)
42	Spence
58	Wonderland Hotel
58	Wonderland Annex
58	Wonderland Servants' Qtrs (Riordan)
58-1A	May or Moore
58-2D	Paine
58-3C	Preston
58-5E	Hicks
58-8H	Tate, Beaman & Tucker

Appalachian Clubhouse

T N & Associates, Inc.
Engineering and Science

0 250 500 1,000 1,500 2,000
Scale in Feet

National Park Service
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, TN 37738

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Alternative D includes exhibits that feature the history of the Town of Elkmont, the natural history of synchronous fireflies and revision of the current brochure at the Elkmont Nature Trail. Under Option 1 (D1), a wayside exhibit would be erected at the former site of the hotel. The focus of the exhibit would be on the history of the hotel and the tourism and travel that led to establishment of the National Park and the conflicts that arose in the Elkmont community over the decision on whether to establish the area as a national park or national forest.

Reconstruction of the Wonderland Hotel and restoration and rehabilitation of the Annex for curatorial purposes is proposed as part of Option 2 (D2). Currently, much of the Park's archival material is stored off- site in facilities that do not meet standards for museum collections and artifact storage, and the Park has identified the need for curatorial space. Under D2, two exhibit panels would be placed on the porch of the reconstructed hotel with information regarding the historic view of the hotel, a description of the scenic vista, social life at Elkmont, and the eventual establishment of the Park. A seating area would be provided and some cultural landscape features (such as the fountain and stairs) would be retained. A pathway up the hill to the former hotel site would be constructed to provide access to the exhibits.

An orientation area, containing a kiosk with an overview of the history and resources of the District and an adjacent parking area would be constructed across Elkmont Road, west of the Wonderland Hotel site. Reserved day use of the Appalachian Clubhouse under special use permit would be included in Alternative D as is installation of interior exhibits, to provide a self- guiding museum. A wayside exhibit would also be installed at the Spence (#42) cabin, describing Colonel Townsend's role in the development of Elkmont. Another wayside exhibit would be provided at the Chapman (#38) cabin describing Chapman's role in establishing the Park.

Under Alternative D, restored buildings would provide the sense of community and spatial relationships in most areas of the District. Restoration of native plant communities would be performed by the Park in disturbed areas. Natural restoration of forested areas would take place in the remaining areas of the District except where parking lots are installed.

2.2.6.2 Land Protection

Alternative D would provide land protection measures consistent with the Park's mission to preserve cultural and natural resources. Although most of the historic buildings in Society Hill and Millionaire's Row would be removed, Alternative D proposes to retain a grouping of buildings for resource interpretation purposes in Daisy Town and an additional grouping for visiting scientist housing in the Wonderland Club. The proposed use of the reconstructed Wonderland Hotel and rehabilitated Annex under D2 is consistent with NPS policies geared towards protection and reuse of the historic buildings to meet needs identified by the Park. A curatorial facility in the District would allow the Park to make cultural collections available to the public and researchers, which is consistent with the resource education themes proposed under this alternative as well. Other cultural landscape features would remain as a link to the past

human occupation of the District. Natural resources would be protected over a large portion of the District by restoring native plant communities at the former building sites.

2.2.6.3 Cultural Resource Management

Alternative D provides for cultural resource management consistent with the Park's mission by proposing exterior restoration of buildings in all areas of the District. In Daisy Town, sixteen cabins and the Appalachian Clubhouse would be restored to their historical exterior appearance. The Appalachian Clubhouse would also be rehabilitated on the interior to allow for public rental and day use, and interior exhibits would provide the opportunity for visitors to use the Clubhouse as a self- guiding museum. A variety of structured interpretive programs are also included in D1 and D2.

An existing walking path, in the location of the boardwalk that was present in Daisy Town into the 1920s would be resurfaced with gravel and would aid in separating pedestrian traffic from vehicular traffic. The path would extend from the Appalachian Clubhouse south to Jakes Creek Cemetery Road. The Chapman cabin (#38) would be restored on the exterior, preserved on the interior, and would serve as an interpretive exhibit. In Millionaire's Row, the interior of the Spence cabin (#42) would be preserved, the exterior would be restored and the cabin would be the focus of another wayside exhibit. A path would be provided to the Spence cabin to allow for a pedestrian walking tour of the area. In the Wonderland area, six cabins would be restored on the exterior and rehabilitated on the interior for use as lodging for visiting scientists. Under D1, the Wonderland Hotel and Annex would be removed, while under D2, the Wonderland Hotel would be reconstructed and the Annex restored on the exterior and rehabilitated on the interior for curatorial storage. All work would be done in accordance with *The Secretary's Standards* (NPS 1995; Revised 2001).

Alternative D would protect and perpetuate cultural resources by preserving buildings and representative cultural landscapes throughout the District. This alternative also provides opportunities to convey the history of several important figures in Elkmont's past. Some cultural landscape features such as stonework and foundations would be retained at the sites where buildings are removed. Measures to avoid potential impacts to shallow archeological deposits would be used and are described in the Section 2.1.1 of this document. Appendix E provides recommendations for specific buildings, or groups of buildings, and other areas where modifications are proposed.

2.2.6.4 Natural Resource Management

Alternative D proposes restoration of native plant communities with plants propagated form native seed sources and salvaged plants collected from within the District. Plant materials could be transplanted from locations within the District to accomplish a variety of activities including restoration of plant communities at the former building sites, creation of visual buffers to screen parking areas, and soil stabilization.

The most intensive use of buildings in this alternative would occur in the Wonderland Club, where six cabins are proposed to be restored and rehabilitated as temporary housing for visiting scientists. Overnight use would be restricted to visiting scientists. Additional sewerage loads resulting from overnight use and increased visitation would

have to meet water quality standards. No additional activities are proposed within the 100- year floodplain.

D2 also includes an option to reconstruct the Wonderland Hotel and rehabilitate the Annex for curatorial purposes. Disturbance of plant communities would occur in order to accommodate these uses. Current natural resource management practices for controlling non- native species, treating hemlock woolly adelgid infestations and other monitoring activities would continue at their current level.

2.2.6.5 Interpretation and Visitor Use
The Visitor Education focus would be interpretation of the changing landscape, construction of the railroad and establishment of the Town of Elkmont, the logging history of the area, and the travel and tourism that eventually led to establishment of the Park. Visitors would have an opportunity to participate in structured interpretive programs at the Appalachian Clubhouse offered by Park staff from May through October. In addition to the interpretive features included in Alternative A, a wayside exhibit providing a historical perspective on Colonel Chapman's role in establishing the Park is proposed under this alternative. The brochure currently available for interpretation at the Elkmont Nature Trail would be revised to include historical information about Elkmont and would emphasize the integration of cultural and natural resource themes. An additional exhibit would be constructed at the Spence cabin (#42) that would include a historical perspective of Colonel Townsend's role in the development of Elkmont. Exhibits would be installed in a variety of locations in Daisy Town and adjacent to the Appalachian Clubhouse. Interior exhibits would be provided in the Clubhouse, which would serve as a self- guiding museum and day use facility. In conjunction with these interpretive features, Alternative D would include enhanced opportunities for seasonal natural and cultural resource education programs that would be offered to the public by Park staff.

Alternative D would provide visitors with opportunities to learn about Elkmont's human occupation while maintaining and restoring plant communities where buildings are removed. This alternative would maintain existing levels of traditional recreation, such as hiking, fishing and camping. Alternative D would also restore and rehabilitate a variety of buildings to provide a sense of character of each of the District's built environments. Some cultural landscape features such as stonework and foundations would be retained to allow for interpretation at sites where buildings are removed.

2.2.6.6 Facilities Development with Detailed Site Plans for Alternative D
Under Alternative D, sixteen (16) cabins/buildings in Daisy Town, the Chapman cabin in Society Hill, the Spence cabin in Millionaire's Row, six cabins in the Wonderland Club and the Appalachian Clubhouse would be restored on the exterior, preserved on the interior and would have interpretive exhibits. The interior of the Appalachian Clubhouse would be rehabilitated to allow for public rental and day use with the display of interpretive exhibits. The interiors of the six cabins in the Wonderland Club would also be rehabilitated to allow for their use as temporary housing for visiting scientists.

Two options for the Wonderland Hotel and Annex are under consideration in this alternative. Option 1 (D1) includes removal of both buildings and revegetation of the area disturbed during removal. Option 2 (D2) proposes to remove the existing Wonderland Hotel and reconstruct it in a manner representative of its historic configuration. The hotel is proposed to be used for both public and Park administrative needs in conjunction with the restored and rehabilitated Annex. Both the hotel and the Annex would be used primarily for curatorial purposes, although public exhibit spaces would be provided. All of the remaining historic buildings would be removed. Removal would be accomplished either by mechanical means or by hand removal. Foundations and buried features would not be excavated. Following removal, former building sites would be revegetated with plants propagated from native seed sources and salvaged plants collected within the District. Details of this alternative are provided below and summarized in Tables 2- 12 and 2- 17 through 2- 23.

Specific project implementation requirements for Alternative D include:

D1 includes all proposed infrastructure improvements described for Alternative B. In addition, D1 addresses a Park need for housing visiting scientists by providing temporary housing in six (6) Wonderland Club cabins. This housing proposal would also require water and sewer service to the designated cabins, as well as improved access and parking. D2 also addresses a Park need by providing curatorial storage. The reconstruction of the Wonderland Hotel and restoration and rehabilitation of the Annex under D2 would provide the Park with needed curatorial facilities and additional exhibits in the lobby of the hotel. To accommodate these improvements, water and sewer service to the Wonderland Hotel and Annex, as well as improved access and parking would be needed under D2. Proposed improvements for both alternatives are described below. Primary features of this alternative are summarized in Table 2- 12.

Water

Water demands of D1 were determined using the methods described in Alternative B. In addition to water needs described in Alternative B, water will be needed to service the cabins retained for lodging visiting scientists. Therefore, the total additional domestic water demand generated by D1 is the water demand for Alternative B plus the additional water demand for the cabins. It would also be necessary to provide a fire suppression system (as described in Alternative B) for each of the cabins for which overnight housing is proposed. The water supply system provided for D1 must be capable of meeting all of the needs described above. Water supply system lines would have to be added to service the day use facilities in the Appalachian Clubhouse and the Wonderland Hotel, Annex and cabins.

The increased pedestrian and vehicular traffic projected for this alternative, in conjunction with public restroom facilities proposed within the Wonderland Hotel, would generate additional water (and wastewater) demands. Therefore, in addition to the improvements described for D1, D2 requires increasing the size of the water distribution line to the Wonderland Hotel. The need for water for fire suppression in D2 would not change (as compared to D1) since a dry fire suppression is proposed for the hotel and Annex curatorial facility.

Wastewater

Based on the number of buildings to be retained and the estimated number of visiting scientists using the cabins for overnight stays, the additional wastewater generated by D1 is estimated as follows:

Number of cabins	6
Total number of bedrooms	18
Total number of guests	18
Wastewater per guest	50 gpd
Wastewater generated	900 gpd

The wastewater flow generated by the use of the Appalachian Clubhouse (1,300 gpd, as described previously) and the cabins proposed to be retained in the Wonderland area (900 gpd) would require modifications to the wastewater treatment system to accommodate the total discharge of 2,200 gpd under D1. Wastewater flows generated during peak usage periods in combination with the peak wastewater flows generated by the existing campground would exceed the design capacity of the existing wastewater treatment plant. Proposed improvements to the wastewater system for D1 include wastewater treatment plant upgrades, addition of a pump station to serve the six visiting scientist cabins, and additional sewer lines. Sewer work would occur following building removal, but prior to completion of any necessary roadway or access trail improvements.

Under D2, average daily visitation is projected to be approximately 526 visits per day. In addition, with the increased number of destinations within the District, the anticipated duration of individual stays is expected to increase. As a result of increased lengths of stay and additional public restroom facilities being provided within the reconstructed Wonderland Hotel, wastewater treatment demands would be greater than those previously described for other alternatives. To accommodate the increased wastewater discharge under D2, sewer lines leading from the Wonderland Hotel restrooms must be constructed in addition to the wastewater treatment plant and sewer line upgrades described in D1.

Roads

Proposed roadway improvements necessary to implement D1 and D2 are similar to those described in Alternative B. However, Alternative D must also provide vehicular access to and from the cabins designated for use by visiting scientists. The roadway improvements must accommodate very few vehicle trips, but be capable of providing access in all weather conditions and allow for 2- way traffic. Therefore, in addition to the infrastructure modifications specified under Alternative B, Alternative D also includes widening and paving of portions of roadways leading to the cabins.

Parking and Access

Parking must be provided at each of the cabins to enable the visiting scientists to load and unload equipment. The number of parking spaces made available to the scientists would be as few as one per cabin. In addition, the existing Jakes Creek Road is proposed to be used as a trail leading to exhibits at the Chapman cabin. To accommodate these

features, in addition to parking construction under Alternative B, D1 would require minor repairs and repair of the existing roadway to accommodate the need for a stable walking surface. In addition, under D2, a path will be constructed from the base of the Wonderland Hotel steps in the vicinity of the historic walkway on the west side of the steps to the top of the steps.

All parking improvements proposed in D2 include those described for D1 with the exception of the need for additional parking to serve the Wonderland Hotel. Day visitors, researchers and NPS curatorial staff will require an additional 61 parking spaces in the proximity of the Wonderland Hotel. An approximate 3,000 square yard pervious concrete parking area located adjacent to the Wonderland Hotel on the east side is proposed to meet this additional parking need. In addition, the orientation parking area would be expanded to 25 spaces to accommodate the need for additional parking as visitation increases.

Other requirements for both options of Alternative D include:

- Provide a visual screen utilizing plant materials relocated from other areas in the District for all proposed parking areas to minimize the visual intrusion of the parking areas into the cultural landscape.
- Repair the footings of a small footbridge over Bearwallow Branch and restore the surface as a safety measure for pedestrians

2.2.6.6 Estimated Development Costs

The estimated range of costs for site development and implementation of D1 and D2 are provided in Appendix C of this document. Appendix C includes an itemized list of costs and post- construction operation and maintenance costs as well. Total costs of D1 and D2 are based on estimating the funds necessary to perform the following items:

- Building removal, rehabilitation, restoration, preservation and reconstruction
- Infrastructure improvements
    - Parking lots (improvements and new lots)
    - Road system improvements
    - Water system improvements
    - Wastewater system improvements
- Furniture and fixtures
- Vegetation management
- Resource education components
- Mitigation measures to be implemented as part of the alternative
- Resource /visitor protection patrols

Table 2- 12: Summary of Implementation Features for Alternative D

Use of Historic Buildings	16 cabins / buildings in Daisy Town, the Chapman cabin in Society Hill, the Spence cabin in Millionaire's Row, six cabins in the Wonderland Club and the Appalachian Clubhouse retained; Wonderland Hotel and Annex will be removed under D1. Under D2, the Hotel would be reconstructed and the Annex restored and rehabilitated for curatorial purposes. All other buildings would be removed
Measures for Buildings Retained	Restore exteriors according to 1920s – 1930s appearance and preserve interiors of Daisy Town, Spence and Chapman cabins; restore exterior of Appalachian Clubhouse and rehabilitate interior to provide for public rental and day use; restore exterior and rehabilitate the interior of 6 cabins in Wonderland Club for scientist housing. Restore exterior of Annex and rehabilitate interior, and reconstruct and maintain Wonderland Hotel (D2). All work would be done in accordance with *The Secretary's Treatment Standards*.
Natural Resources Management	Continued implementation of current management activities including hemlock management, water quality monitoring, fish population assessment, and general maintenance to existing infrastructure; and revegetation of areas where buildings have been removed
Visitor Use	Visitation is expected to increase. Use would consist of continued use of existing hiking trails, camping, fishing and other compatible recreational activities, but would also require upgrades to infrastructure to accommodate additional water use, wastewater treatment, electrical service and upgrade of roadways to allow for distribution of supplies and services
Interpretive Features	Up to 11 locations throughout the District where exhibits are to be installed focusing on natural and cultural resources, history of Elkmont, history of Park establishment, and historical perspective of Chapman and Townsend
Access / Circulation	• Relocate road gate on Little River Road to east end of Little River trailhead parking area • Relocate gate or install new gate at beginning of Jakes Creek Road • Resurface gravel path in Daisy Town from Appalachian Clubhouse to road to Jakes Creek cemetery • Little River trailhead paving - 350 lf • Daisy Town loop paving- 1,111 lf • Orientation parking access road - 400 lf • Gravel walking path from Little River Trailhead to Spence (#42) cabin - 550 lf • Walking path from Orientation parking lot leading along Elkmont Road to base of Wonderland steps - 550 lf • Road from Elkmont Road to rear of Hotel – 750 lf • Repave one lane asphalt road off of Catron Branch Road from hotel parking to Beaman (58- 8H) cabin – 350 lf • Place gravel on road segment from roadway to Paine (#58- 2B) cabin – 300 lf • Construct a path from base of Wonderland steps in vicinity of historic walkway on west side of steps to the top of the steps - 400 lf (D2)

Table 2- 12: Summary of Implementation Features for Alternative D (continued)

Parking	4 parking areas proposed; if Wonderland Hotel is reconstructed (D2), include additional parking area behind hotel
Utilities	Add restroom facility and sprinkler system to the day use area of the Appalachian Club. Also includes: Water Supply: • 1,300 lf water line to Appalachian Clubhouse • If Wonderland Hotel is removed (D1), include 7,500 lf of 6" water line to service Wonderland cabins • If Wonderland Hotel is reconstructed (D2), include 7,500 lf of 8" water line to service hotel, Annex and Wonderland cabins; add dry sprinkler system to hotel and Annex • Water service lines from individual buildings to main water lines Wastewater System: • 640 lf gravity sewer line from Appalachian Clubhouse • 600 lf gravity sewer line serving Wonderland cabins • 4" gravity sewer line from individual cabins to sewer main • 600 lf 2" low pressure sewer force main serving Paine cabin • 3,200 lf 3" sewer force main from rear of Wonderland Hotel to existing sewer line in campground • 225 cubic foot flow equalization basin at the wastewater treatment plant
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	Implementation of this alternative would eliminate the need for those resources currently being used to stabilize historic buildings not retained under this alternative and any costs associated with the rental or lease of offsite curatorial facilities; however, operation and maintenance costs would be required to maintain the infrastructure serving the buildings retained and to process special use permits. In addition, maintenance of the visiting scientist housing and curatorial facilities, staff time and resources for educational programs and staff for the curatorial facilities proposed under D2 would be required.

2.2.7 Alternative E

2.2.7.1 Concept

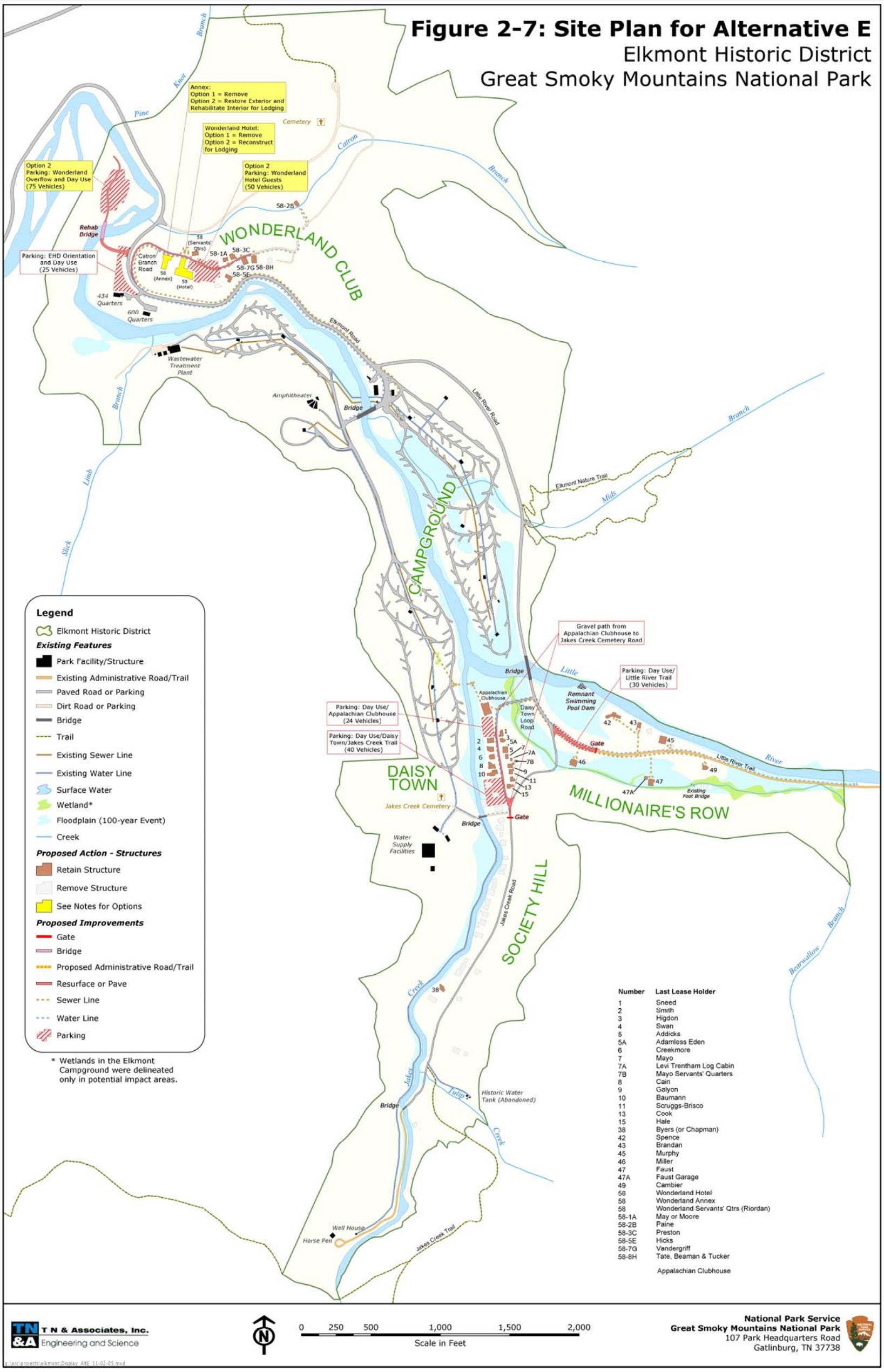
Alternative E emphasizes use of some buildings for public lodging and visiting scientist housing, and retention of others for interpretive purposes. In- depth educational programs for the general public would be provided. Emphasis is on restoration of the cultural character of multiple components of the District. This alternative would result in greater intensity of reuse by providing overnight accommodations for larger numbers of people, including limited dining facilities, but would also maintain a commitment to visitor education. An option to participate in structured educational programs would be made available to lodging guests. Public overnight use would be limited to the Wonderland Club, while housing for visiting scientists would be restricted to Millionaire's Row. Option 2 of Alternative E (E2) also proposes reconstruction of the Wonderland Hotel and rehabilitation of the Annex for public lodging. Public lodging operations and the educational programs would be operated by a concessioner, but the visiting scientist housing would be operated by the Park. The concessioner educational programs included in this alternative are in addition to those provided free to the public seasonally by the Park at the campground. Some restoration of native plant communities would still occur in areas where buildings are removed. Table 2- 13 provides a summary of the proposed treatment for all buildings under Alternative E. The alternative is depicted on Figure 2- 7.

Table 2- 13: Buildings Summary for Alternative E

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	E1: Remove E2: Reconstruct to 1928 footprint	E1: Restoration of native plant communities/wayside exhibit E2: Overnight lodging; meeting rooms; dining hall; exhibits in lobby and on porch; resource education
Annex	E1: Remove if Wonderland Hotel is removed E2: Restore exterior and rehabilitate interior if Wonderland Hotel is reconstructed	E1: Restoration of native plant communities E2: Overnight lodging
Cabins	Rehabilitate 6 contributing and 1 non- contributing cabins	Overnight lodging for groups and families
Millionaire's Row	Rehabilitate 6 contributing cabins and 1 garage; remove 2 non- contributing cabins	Visiting scientist housing; storage; walking tour; wayside exhibits; restoration of native plant communities
Daisy Town		
Appalachian Clubhouse	Restore exterior, rehabilitate interior	Public rental and day use; walking tour with interior self- guiding museum exhibits and wayside exhibits; structured education programs
Cabins	Restore exterior of all 15 contributing cabins and 1 non- contributing cabin to historic configuration	Walking tour with wayside exhibits
Society Hill	Restore Chapman cabin; remove others	Wayside exhibits; restoration of native plant communities

Figure 2-7: Site Plan for Alternative E

Elkmont Historic District
Great Smoky Mountains National Park



Legend

- Elkmont Historic District

Existing Features

- Park Facility/Structure
- Existing Administrative Road/Trail
- Paved Road or Parking
- Dirt Road or Parking
- Bridge
- Trail
- Existing Sewer Line
- Existing Water Line
- Surface Water
- Wetland*
- Floodplain (100-year Event)
- Creek

Proposed Action - Structures

- Retain Structure
- Remove Structure
- See Notes for Options

Proposed Improvements

- Gate
- Bridge
- Proposed Administrative Road/Trail
- Resurface or Pave
- Sewer Line
- Water Line
- Parking

* Wetlands in the Elkmont Campground were delineated only in potential impact areas.

Number	Last Lease Holder
1	Sneed
2	Smith
3	Higdon
4	Swan
5	Addicks
5A	Adamless Eden
6	Creekmore
7	Mayo
7A	Levi Trentham Log Cabin
7B	Mayo Servants' Quarters
8	Cain
9	Galyon
10	Baumann
11	Scruggs-Brisco
13	Cook
15	Hale
38	Byers (or Chapman)
42	Spence
43	Brandan
45	Murphy
46	Miller
47	Faust
47A	Faust Garage
49	Cambier
58	Wonderland Hotel
58	Wonderland Annex
58	Wonderland Servants' Qtrs (Riordan)
58-1A	May or Moore
58-2B	Paine
58-3C	Preston
58-5E	Hicks
58-7G	Vandergriff
58-8H	Tate, Beaman & Tucker
	Appalachian Clubhouse

T N & Associates, Inc.
Engineering and Science

0 250 500 1,000 1,500 2,000
Scale in Feet

National Park Service
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, TN 37738

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2.2.7.2 Land Protection
Alternative E would provide some land protection measures by preserving a variety of cultural resources and some natural resources. Although most of the historic buildings in Society Hill would be removed, Alternative E also proposes to retain the majority of the remaining buildings in the District for lodging purposes and for cultural resource interpretation.

Restoration and rehabilitation of many of the other buildings within the District is consistent with NPS policies geared towards protection of cultural resources. Reconstruction of the Wonderland Hotel (E2) would address an option requested by the public for overnight stays in the hotel; however, reconstruction is subject to NPS policy review. The buildings would be retained along with all significant cultural landscape features, providing a community setting with historical interpretation components. Natural resources would be protected over a portion of the District as well, by allowing for restoration of native plant communities in most of the Society Hill area, and portions of Millionaire's Row and the Wonderland Club where buildings are removed.

2.2.7.3 Cultural Resource Management
Alternative E provides for cultural resource management consistent with the Park's mission by proposing exterior restoration of some of the buildings in all areas of the District. In Daisy Town, sixteen cabins and the Appalachian Clubhouse would be restored to their historical exterior appearance. The Appalachian Clubhouse would also be rehabilitated on the interior to allow for day use and would be equipped with exhibits to serve as a self- guiding museum. The Chapman cabin (#38) in Society Hill would be restored on the exterior. In Millionaire's Row, the exterior of the Spence cabin (#42) would be restored as well. However, Alternative E also proposes to restore the interior of the Spence cabin and to use it for visiting scientist housing along with five other cabins in Millionaire's Row. Seven cabins in the Wonderland Club would be restored and rehabilitated on the interior to accommodate public overnight lodging. One garage in the Millionaire's Row area would be restored on the exterior and rehabilitated on the interior to be used for administrative purposes.

All of the buildings retained within Daisy Town, with the exception of the five non-contributing cabins proposed for removal, would be preserved. An existing walking path, in the location of the boardwalk that was present in Daisy Town into the 1920s would be resurfaced with gravel and would aid in separating pedestrian traffic from vehicular traffic. The path would extend from the Appalachian Clubhouse south to Jakes Creek Cemetery Road.

E2 allows for the Wonderland Hotel to be reconstructed to its 1928 historic configuration and to be used for public lodging. Reconstruction of the Wonderland Hotel would be performed in compliance with *The Secretary's Treatment Standards* (NPS 1995; Revised 2001).

Alternative E would protect and perpetuate cultural resources by preserving buildings and associated landscapes throughout the District. This alternative could potentially

reuse all contributing buildings in the Wonderland Club and Millionaire's Row areas. Where safety considerations allow, retention of cultural landscape features such as stonework and foundations where buildings are removed would provide opportunities for viewing former building sites. Measures to avoid potential impacts to shallow archeological deposits would be used and are described in the Section 2.1.1 of this document. Appendix E provides recommendations for specific buildings, or groups of buildings, and other areas where modifications are proposed.

2.2.7.4 Natural Resource Management

Alternative E proposes restoration of disturbed areas with plants propagated from native seed sources and salvaged plants collected within the District. Seed would be harvested within the District by NPS staff. Plant materials could be transplanted from locations within the District during project implementation to accomplish a variety of activities including restoration of the former building sites, creation of visual buffers to screen parking lots and roadways, and soil stabilization. More buildings would be retained under Alternative E than the alternatives previously described, and the proposed use of these buildings is intensified with additional infrastructure needs to accommodate housing and lodging. Strategies relevant to management of the District that were identified by the NPS would have to be considered for all alternatives, but are of special consideration for proposed alternatives that intensify or increase the demand on resources.

All alternatives must avoid diminishing the value of resources or causing a direct loss of those resources. Alternative E proposes a variety of measures to address these management concerns and to protect and perpetuate natural resources and ecosystems at the District. Overnight use by the public will be limited to the Wonderland Club area, whereas overnight use by visiting scientists will be restricted to the Millionaire's Row cabins. Central trailhead parking will be provided to limit vehicular intrusion into the site. Most of the plant communities within the Society Hill area would remain and restoration with native species would occur where plant communities are disturbed. Current natural resource management practices concentrating on removal of non- native species, treatment of hemlock woolly adelgid infestations, and other monitoring activities would continue at their current level.

2.2.7.5 Interpretation and Visitor Use

The reconstructed hotel (E2 only) and other public lodging facilities within the District would be operated by a concessioner. The concessioner would be responsible for providing in- depth, resource- based educational opportunities for overnight guests. The Appalachian Clubhouse would be rehabilitated on the interior for public rental and day use. Alternative E proposes to include interpretive features, such as wayside exhibits or other resource education components. It would include displays that focus on cultural history, natural history, the logging history of the area and the construction of the railroad that led to the establishment of the Town of Elkmont, as well as a wayside exhibit providing a historical perspective on Colonel Chapman's role in the Park establishment. A wayside exhibit would also be placed adjacent to the synchronous firefly habitat to educate the public on the natural history of this species. The brochure currently available for interpretation of the Elkmont Nature Trail would be revised to

include historical information about Elkmont and would emphasize the integration of cultural and natural resource themes. A wayside exhibit would be installed at the Spence (#42) cabin describing Colonel Townsend's role in the development of the town of Elkmont. Interior exhibits would also be installed at the Spence cabin that would include a historical perspective of the importance of this building and a history of the establishment and operation of the Little River Lumber Company. Another wayside exhibit would be installed at the Murphy (#45) cabin, describing the establishment and operation of the Little River Railroad. In conjunction with these interpretive features, Alternative E would include enhanced opportunities for seasonal natural and cultural resource education programs. While some NPS sponsored programs would still occur within the District, under Alternative E additional programs would be offered by the concessioner to individuals utilizing lodging accommodations. These programs would be included in the cost of the lodging fee and would be provided as an optional activity for lodging visitors.

Alternative E would create opportunities for emotional and intellectual connections to the natural and cultural resources of the District by providing visitors with opportunities to learn about Elkmont's human occupation while maintaining and allowing regeneration of ecosystems where buildings are removed. This alternative would maintain existing levels of traditional recreation, such as hiking, fishing and camping; and add the option of overnight guests participating in structured educational programs. Alternative E would restore a representative collection of buildings in the District to provide a sense of its character and community. Retaining some landscape features such as stonework and foundations would provide opportunities for interpretation of sites where buildings are removed.

2.2.7.6 Facilities Development with Detailed Site Plans for Alternative E
Under Alternative E, 16 cabins/buildings in Daisy Town and the Appalachian Clubhouse; the Chapman (#38) cabin in Society Hill; six cabins, and one garage in Millionaire's Row; and seven cabins in the Wonderland Club would be restored on the exterior. The cabins in Daisy Town would be preserved on the interior. The Chapman cabin would be preserved on the interior and restored on the exterior to allow for use as an exhibit. The interior of six cabins in Millionaire's Row and the Appalachian Clubhouse would be rehabilitated. Housing for visiting scientists would be provided at six cabins in Millionaire's Row and public rental as a day use facility would be provided at the Appalachian Clubhouse. The interior of the seven cabins in the Wonderland Club would be rehabilitated for use as public lodging facilities.

Two options for the Wonderland Hotel and Annex are under consideration in this alternative. Option one includes removal of both buildings and restoration of the plant communities and surrounding area disturbed during removal (E1). Option 2 proposes to remove the existing Wonderland Hotel and reconstruct it in a manner representative of its historic configuration in conjunction with restoration of the exterior and rehabilitation of the interior of the Annex (E2). Both the hotel and the Annex would be used for public lodging. All of the remaining historic buildings not noted above would be removed. Removal would be accomplished either by mechanical means or by hand removal. Foundations and buried features would not be excavated. Following removal,

former building sites would be restored with plants propagated from native seed sources and salvaged plants collected within the District. Restoration of plant communities would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas. Details of this alternative are provided below and summarized in Table 2-14.

Specific project implementation requirements for E1 and E2 include:

E1 includes all the infrastructure needs included for Alternative B. However, E1 emphasizes reuse of the some buildings for interpretive purposes, lodging for the general public and housing for visiting scientists. In addition to the improvements proposed in E1, E2 proposes to reconstruct the Wonderland Hotel and rehabilitate the Annex for overnight guest lodging. Additional interpretive exhibits would also be installed in the lobby and on the porch of the hotel. A 100- seat restaurant open only to overnight lodging guests and visiting scientists in Elkmont would be provided within the Hotel. As described previously, this alternative also proposes to provide opportunities for educational programs as part of the lodging fee. To accommodate these improvements, water and sewer service to the Wonderland Hotel and Annex would be necessary, as well as improved access and parking for the general public at the Wonderland Hotel. The following infrastructure improvements must be made to facilitate implementation of these alternatives:

Water

Day use at the Appalachian Clubhouse would remain the same for Alternative E as described under Alternative B. Other requirements for E1 and E2 include water supply to visiting scientist housing in Millionaire's Row. This line would supply water to visitors and would connect to a fire suppression system installed in each cabin to be used for lodging. State building codes require that buildings used for overnight lodging be provided with a fire suppression (sprinkler) system meeting the NFPA 13R standard. Therefore, the water supply system for this alternative must be capable of meeting this requirement. To accommodate these needs, a water line must be installed from the Jakes Creek Cemetery water storage tanks to supply water to the Wonderland Hotel, the Appalachian Club, and the cabins proposed for lodging in Millionaire's Row.

The lodging and dining opportunities proposed by E2 at the Wonderland Hotel and Annex would generate additional water supply and fire suppression (and wastewater) demands. As part of Alternative E, a new water supply well and distribution lines from that well must be added to provide additional water to service the needs described. While the capacity of the existing well can accommodate the necessary increase in volume, this demand, combined with the current peak season demand of 22,240 gallons per day, is close to the maximum capacity of the present system (35,000 gpd). For additional water supply and for redundancy in the event of a problem with the present system, it would be necessary to include an additional water supply well and water supply line in the Millionaire's Row area to connect to the water system and distribute water to the cabins. This line would be extended (and the diameter of the distribution line increased from 6 inches to 8 inches) to accommodate lodging at the Wonderland

Hotel and Annex proposed under E2. All proposed water supply improvements are listed in Table 2- 21 at the end of this chapter.

Wastewater

Under Alternative E, average day use visitation is projected to be approximately 526 visits per day. In addition, with the increased number of destinations within the District, the anticipated duration of individual stays is expected to increase. As a result of increased lengths of stay and additional public restroom facilities being provided within the reconstructed Wonderland Hotel, wastewater demands would be greater than those previously described for other alternatives. To accommodate the increased wastewater discharge under E2, sewer lines leading from the Wonderland Hotel restrooms must be constructed in addition to the wastewater treatment plant and sewer line upgrades.

Based on the number of buildings to be retained and the estimated number of visiting scientists using the cabins for overnight stays, the additional wastewater generated by Alternative E was estimated as follows:

	E1	E2
Water needs of visiting scientists	1,375 gpd	1,375 gpd
Water needs for public lodging (cabins)	4,275 gpd	4,275 gpd
Water needs at Appalachian Clubhouse	1,710 gpd	1,710 gpd
Water for Wonderland Hotel and Annex		10,610 gpd
Total water required	7,360 gpd	17,970 gpd
Wastewater generated	5,888 gpd	14,376 gpd

In addition to the wastewater system improvements described for Alternative B, E1 also requires wastewater treatment plant improvements. The wastewater flow generated by the use of the Appalachian Clubhouse (1,300 gpd, as described previously) and the cabins proposed to be retained in the Wonderland area would require modifications to the wastewater treatment system to accommodate the total discharge of 5,888 gpd under E1. Wastewater flows generated during peak usage periods in combination with the peak wastewater flows generated by the existing campground would exceed the design capacity of the existing wastewater treatment plant. Proposed improvements to the wastewater system for E1 include installation of sewer service lines to all areas proposed for lodging, food service or public day use under this alternative. These modifications would also include construction of a 225 cubic foot flow equalization basin; installation of sewage grinder pump stations and one sewage pump station to serve seven cabins east of the Wonderland Hotel; and installation of sewer lines servicing all cabins proposed for scientist or public lodging.

The wastewater system for E2 must account for estimated wastewater generated by the cabins proposed for lodging, the visiting scientist housing at the Millionaire's Row cabins, day use of the Appalachian Clubhouse, restroom facilities at the Appalachian Clubhouse, the restaurant and lodging at the Wonderland Hotel and Annex, and a public restroom at the Wonderland Hotel. Based on the increased wastewater flows associated with E2, the design capacity of the existing wastewater treatment facility, and the additional improvements required, it would be necessary to provide additional capacity

to accommodate peak daily flows entering the wastewater treatment facility from these improvements, combined with existing flows for the campground. To accommodate these wastewater needs, in addition to the requirements of Alternative B, a 225- cubic foot flow equalization basin would be constructed. To treat the wastewater flow exceeding the capacity of the existing treatment plant (currently estimated at 5,000 gallons per day), one of two methods could be utilized. The first method requires construction of a drip irrigation system at a suitable location outside of the District. The second method would require installation of a sewer line to carry excess wastewater to the Gatlinburg treatment plant. All wastewater system components to be installed under this alternative are listed in Table 2- 22 at the end of this chapter.

Roads

In addition to the roadway improvements described under Alternative B, roadway modifications necessary to implement Alternative E include minor widening and paving of roadways to the cabins in the Wonderland Club and those in Millionaire's Row. E2 also requires additional work to provide access to parking areas. As part of this alternative, it would be necessary to upgrade or replace the existing one- lane bridge over the Little River (across the road from the Wonderland Hotel and north of the modern 434 and 600 quarters) with a new thirty- two (32) foot wide, two- lane bridge, approximately 125 feet long. The bridge would be wide enough to include a walking trail. This work would be followed by widening and paving the existing one- lane road to the new two- lane bridge and to a new parking area north of the bridge. Additional investigations into the condition of the existing bridge must be undertaken to determine all design and construction requirements for rehabilitation or replacement of this structure.

Parking and Access

Alternative E includes parking at the District Orientation Area (25 spaces), at the Little River Trailhead (30 spaces), at the Appalachian Clubhouse (24 spaces), and at the Daisy Town / Jakes Creek Trailhead (40 spaces). Parking must be provided at each of the cabins proposed for visiting scientist lodging in Millionaire's Row to enable the visiting scientists to load and unload equipment. The number of parking spaces made available to the scientists would be as few as one per cabin.

E2 also must address the need for additional parking adjacent to the Wonderland Hotel. Based on parking needs projected for this alternative, a total of 128 spaces are required at the Wonderland Hotel, requiring construction of two additional parking lots. One would be located adjacent to the east side of the Wonderland Hotel and the other would be across the Little River bridge at the area where air quality monitoring equipment is now located. Pathways would be provided from the lots to the hotel.

Access modifications for Alternative E would also include minor repairs and repaving a portion of Daisy Town Loop Road and Jakes Creek Road to provide a stable walking surface for access to the Chapman cabin and proposed wayside exhibits at that location.

Other requirements for both options of Alternative E include:
Provide a visual screen utilizing plant materials relocated from other areas in the District for all proposed parking areas to minimize the visual intrusion of the parking areas into the cultural landscape.

- Repair the footings of a small footbridge over Bearwallow Branch and restore the surface as a safety measure for pedestrians
- One lane asphalt on Catron Branch Road from hotel parking to Beaman (58- 8H) cabin
- Place gravel on road segment from Catron Branch Road to Paine (58- 2B) cabin

Primary features of this alternative are summarized in Table 2- 14.

2.2.7.7 Estimated Development Costs
The estimated range of costs for site development and implementation of E1 and E2 are provided in Appendix C of this document, including an itemized list of costs and post-construction operation and maintenance costs. Total costs of E1 and E2 are based on estimating the funds necessary to perform the following items:

- Building removal, rehabilitation, restoration, preservation and reconstruction
- Infrastructure improvements
    - Parking lots (improvements and new lots)
    - Road system improvements
    - Water system improvements
    - Wastewater system improvements
- Furniture, fixtures and equipment (associated with buildings for lodging)
- Vegetation management
- Resource education components
- Mitigation measures to be implemented as part of the alternative
- Resource /visitor protection patrols

Table 2- 14: Summary of Implementation Features for Alternative E

Use of Historic Buildings	16 cabins / buildings in Daisy Town, the Chapman cabin in Society Hill, six cabins in Millionaire's Row, seven cabins in the Wonderland Club and the Appalachian Clubhouse would be retained; Wonderland Hotel and Annex would be removed under E1. Under E2, the Hotel would be reconstructed and the Annex rehabilitated for lodging purposes. All other buildings would be removed.
Measures for Buildings Retained	Restore exterior to 1920s - 1930s appearance and preserve interior of Daisy Town and Chapman cabins; restore exterior of Appalachian Clubhouse and rehabilitate interior to allow for public rental and day use; restore exterior and rehabilitate interior of cabins retained in Millionaire's Row and in the Wonderland Club for lodging purposes; under E2, restore exterior of Annex and rehabilitate interior for lodging and reconstruct Wonderland Hotel to be used for lodging.
Natural Resources Management	Continued implementation of current management activities including hemlock management, water quality monitoring, fish population assessment, and general maintenance to existing infrastructure; and revegetation of areas where buildings have been removed
Visitor Use	Visitation is expected to increase under this alternative. Use of existing hiking trails, camping, fishing and other compatible recreational activities would continue, but would require upgrades to infrastructure to accommodate additional water use, wastewater treatment, electrical service and use of the transportation system.
Interpretive Features	Up to 14 locations throughout the District with interpretive features including an information kiosk, brochure, wayside exhibits and interior exhibits would be provided, focusing on natural and cultural resources, history of Elkmont, history of Park establishment, and historical perspective of Chapman and Townsend.
Access / Circulation	• Relocate road gate on Little River Road to the east end of Little River trailhead parking area • Relocate existing gate or install new gate at beginning of Jakes Creek Road • Resurface gravel path in Daisy Town from Appalachian Clubhouse to road to Jakes Creek cemetery • Little River trailhead paving- 350 lf • Daisy Town loop paving – 1,111 lf • Orientation parking area access road - 400 lf • Gravel walking path from Little River Trailhead to Spence (#42) cabin - 550 lf • Walking path from Orientation parking lot leading along Elkmont Road to base of Wonderland steps - 550 lf • Road from Elkmont Road to rear of Hotel – 750 lf • One lane asphalt on Catron Branch Road from hotel parking to Beaman (#58- 8H) cabin – 350 lf • Place gravel on road segment from Catron Branch Road to Paine (#58- 2B)cabin – 300 lf • One lane asphalt at Millionaire's Row to gate for access to Cambier (#49) cabin (1167 lf) • Path from base of Wonderland steps in vicinity of historic walkway on west side of steps to the top of the steps - 400 lf If Wonderland Hotel is reconstructed, include: • Upgrade existing bridge over Little River to two lanes to connect with Wonderland overflow parking area across the River • Walking path from Wonderland overflow parking – 800 lf

Table 2- 14: Summary of Implementation Features for Alternative E (continued)

Parking	4 parking areas proposed plus parking at cabins proposed for lodging If Wonderland Hotel is reconstructed (E2), two additional parking areas include: • Parking area behind hotel • Remote parking across the Little River from the Wonderland Hotel would be accessed by a new two- lane bridge
Utilities	Add restroom facilities and sprinkler system to the day use area of the Appalachian Club. Also includes: Water Supply: • 1,300 lf 4" water line to Appalachian Clubhouse • 1,750 lf 4" water line from Appalachian Clubhouse to Millionaire's Row • Water service lines from individual buildings to main water lines • New water supply well and 1,150 lf 4" water pipe to connect to system • If Wonderland Hotel is removed, include 7,500 lf 6" water line to service Wonderland cabins • If Wonderland Hotel is reconstructed, include 7,500 lf of 8" water line to service hotel and Wonderland cabins; add sprinkler system to hotel and Annex Wastewater System: • 640 lf 8" gravity sewer line from Appalachian Clubhouse • 600 lf 8"gravity sewer line serving Wonderland cabins • 4" gravity sewer line from individual Wonderland cabins to sewer main • 600 lf 2" low pressure sewer force main serving Paine cabin • 3,200 lf 3" sewer force main from rear of Wonderland Hotel to existing sewer line in campground • 225 cubic foot flow equalization basin at the wastewater treatment plant • 2,400 lf 3" low pressure force main from Appalachian Clubhouse to Millionaire's Row cabins • Sewage grinder pump stations and one sewage pump to service 6 Wonderland cabins If Wonderland Hotel is reconstructed: 5,000 gpd wastewater treatment system expansion with a drip irrigation system located outside of the District 6" gravity sewer lines for Wonderland Hotel and Annex
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	Implementation of this alternative would eliminate the need for those resources currently being utilized to stabilize historic buildings not retained; however, some operation and maintenance costs would be required to maintain the infrastructure serving the buildings retained and to process special use permits for the clubhouse. Staff time and resources would be required for educational programs conducted by NPS at the Appalachian Clubhouse, as well as management of the concessioner contract under E2. Maintenance of cabins used for scientist housing would be the responsibility of NPS and buildings used for public lodging would be the responsibility of the concessioner.

2.2.8 Alternative F

2.2.8.1 Concept

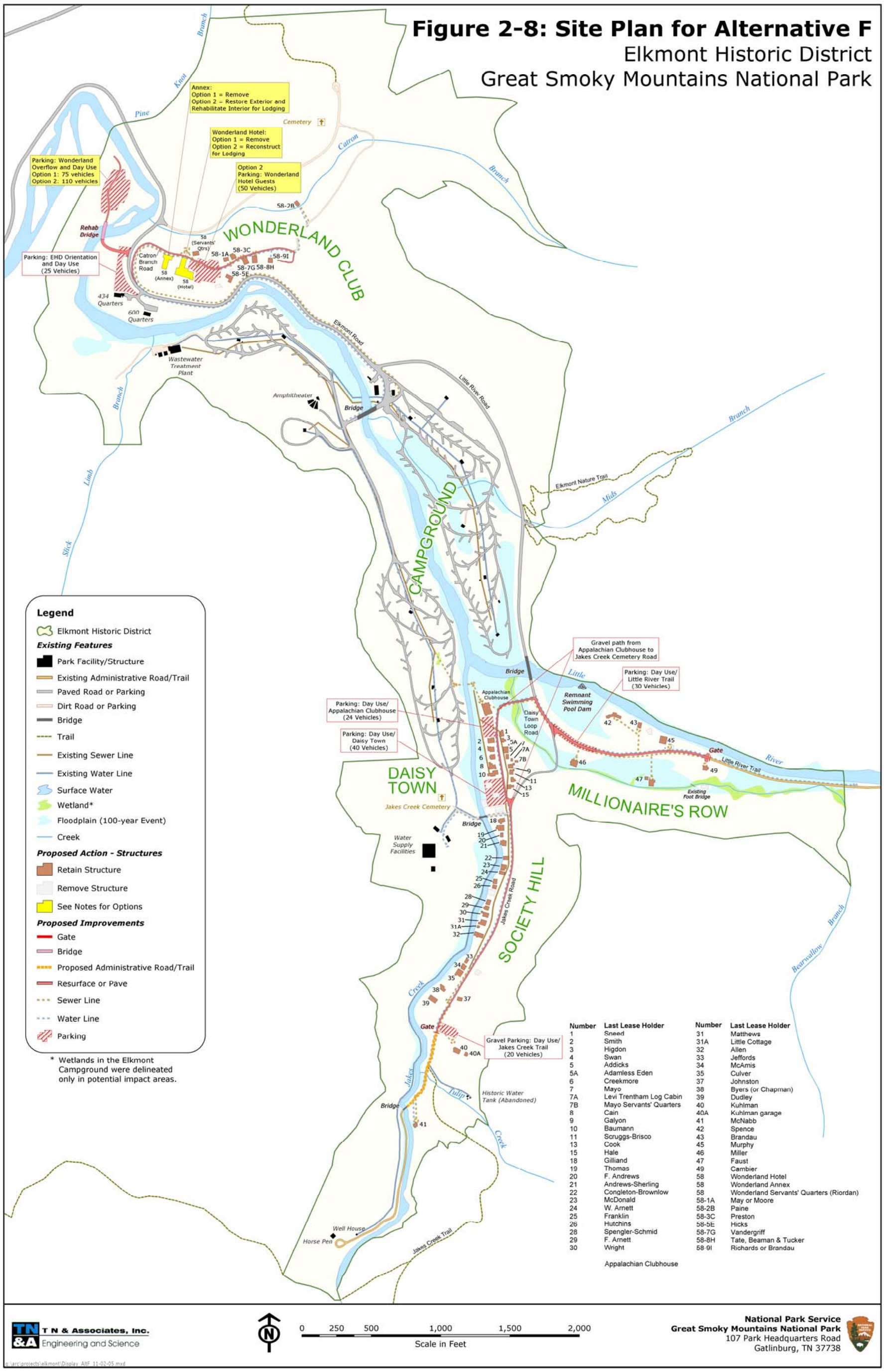
Alternative F proposes the greatest intensity of reuse of historic buildings, primarily in the form of overnight accommodations and dining facilities for the general public. The emphasis is on restoration of the cultural and social character of the District by retaining most of its historic buildings. Education and interpretation would be provided at the orientation kiosk, on the Wonderland Hotel porch and in the hotel lobby (F2), in Daisy Town, at the Appalachian Clubhouse, at the Spence cabin in Millionaire's Row, and at the Chapman cabin in Society Hill. An option to participate in structured educational programs would be made available to overnight guests and the general public for a fee in addition to Park programs already provided seasonally at the campground for no charge. Protection of natural resources would be dependent upon operational procedures and visitor regulations required of the concession operator. Table 2- 15 provides a summary of the proposed treatment for all buildings under Alternative F. The alternative is depicted in Figure 2- 8 on the following page.

Table 2- 15: Buildings Summary for Alternative F

Area/Buildings	Status	Uses
Wonderland Club		
Wonderland Hotel	F1: Remove F2: Reconstruct to 1928 footprint	F1: Restoration of native plant communities; wayside exhibits F2: Overnight lodging; meeting rooms; dining hall; exhibits in lobby, at top of stairs and on porch; resource education- based programming
Annex	F1: Remove if Wonderland Hotel is removed F2: Restore exterior and rehabilitate interior if Wonderland Hotel is reconstructed	F1: Restoration of native plant communities F2: Overnight public lodging
Cabins	Restore and rehabilitate all 6 contributing cabins and 2 non- contributing cabins	Overnight rental; storage
Millionaire's Row	Restore and rehabilitate 6 contributing cabins and one garage; remove two non-contributing cabins	Overnight rental; storage Restoration of native plant communities; wayside and interior exhibits
Daisy Town		
Appalachian Clubhouse	Restore exterior and rehabilitate the interior	As part of the concession operation, day use; walking tour with interior self- guiding museum exhibits and wayside exhibits
Cabins	Restore the exterior of all contributing cabins and return one non- contributing cabin to historic configuration	Walking tour with wayside exhibits
Society Hill	Restore and rehabilitate 15 contributing buildings and 8 non- contributing buildings	Wayside exhibit; overnight rentals

Figure 2-8: Site Plan for Alternative F

Elkmont Historic District
Great Smoky Mountains National Park



2.2.8.2 Land Protection

Alternative F would provide some land protection measures by being consistent with the Park's mission to preserve a variety of resources. Alternative F proposes to retain most of the historic buildings in the District. While the majority of the buildings would be used for lodging purposes, some would be used for visitor education and interpretation. The buildings would be retained along with all significant cultural landscape features, providing a community setting with historical interpretation components. Natural resources would be protected in some areas of the District by restoring native plant communities where buildings are removed, except where parking lots are constructed.

2.2.8.3 Cultural Resource Management

Alternative F provides for cultural resource management consistent with the Park's mission by proposing exterior restoration of the majority of the historic buildings in all areas of the District. This alternative would also incorporate all of the interpretive exhibits and materials described in Alternative A, along with additional exhibits focused on cultural history, natural history, architecture, the logging history of the area, construction of the railroad, and eventual establishment of the Town of Elkmont.

In Daisy Town, sixteen cabins and the Appalachian Clubhouse would be restored to their historical exterior appearance. The Appalachian Clubhouse would also be rehabilitated on the interior to allow for day use and equipped with exhibits to serve as a self- guiding museum. In Daisy Town, the historic walking path, would be restored with gravel and used to separate pedestrian and vehicular traffic. The path would extend from the Appalachian Clubhouse south to the road to Jakes Creek Cemetery Road. In Society Hill, twenty- two cabins would be restored on the exterior and rehabilitated on the interior to allow for public lodging. The Chapman cabin (#38) in Society Hill would be retained as the focus for an interpretive exhibit highlighting the contribution of Colonel Chapman to the formation of the Park. One garage would be restored on the exterior and rehabilitated on the interior. A woodshed adjacent to the Kuhlman cabin (#40) would also be retained. F1 proposes to restore exterior and rehabilitate the interior of six cabins in Millionaire's Row and eight cabins in the Wonderland Club for use as overnight lodging for the public.

No visiting scientist housing is provided in Alternative F. Instead, rehabilitated cabins would be operated by the concessioner and rented to the public for overnight lodging in the Wonderland area and in Millionaire's Row. All restoration and rehabilitation would take place in accordance with *The Secretary's Treatment Standards*.

One option under this alternative (F2) calls for the Wonderland Hotel to be reconstructed to its historic configuration and to be used for public lodging. Reconstruction of the Wonderland Hotel would have to be performed in compliance with *The Secretary's Treatment Standards*. The reconstructed hotel and other lodging facilities within the District would be operated by a concessioner, who would also be responsible for providing resource- based educational opportunities. However, the NPS would continue to provide seasonal staff- led education programs for the general public at no charge.

Alternative F retains buildings and component landscapes in clusters and associations sufficient to provide a sense of the character of the District. Alternative F would retain most contributing buildings for overnight use or as exhibits. Measures to avoid potential impacts to shallow archeological deposits would be used and are described in the Section 2.1.1 of this document. Appendix E provides recommendations for specific buildings, or groups of buildings, and other areas where modifications are proposed. Alternative F would also provide opportunities to convey the history of several important figures in Elkmont's history.

2.2.8.4 Natural Resource Management

Most of the existing buildings would be retained under Alternative F, and the proposed use of these buildings is intensified because of the infrastructure needed to accommodate lodging, day use, interpretive exhibits, and access to other areas such as existing trailheads. Due to the proposed increase in intensity of use and potential increase in demand on resources, natural resource management strategies designed to avoid impacts to the Little River, floodplains, wetlands, plant communities and wildlife habitat are of even greater importance than alternatives that propose a lower level of use.

As a result, under Alternative F, sewage treatment options have been proposed and intend to provide protection to aquatic resources in compliance with current water quality standards mandated through law, codes, and policies. Alternative F proposes restoration with plants propagated from native seed and with salvaged plants collected in the District. Plant materials could be transplanted from locations within the District to accomplish a variety of activities including revegetation of the former building sites, creation of visual buffers and soil stabilization. Current natural resource management practices concentrating on removal of non- native species, treatment of hemlock woolly adelgid infestations, and other monitoring activities would continue at their current level. This alternative would manage potential visitor impacts through operational procedures and regulations required of the concession operator.

2.2.8.5 Interpretation and Visitor Use

This alternative proposes to include interpretive features, such as wayside exhibits and other resource education components. Alternative F would also include displays that focus on cultural history, natural history, architecture, the logging history of the area and the construction of the railroad that led to the establishment of Elkmont, as well as a wayside exhibit providing a historical perspective on Colonel Chapman's role in establishment of the Park. A wayside exhibit would also be placed adjacent to the synchronous firefly habitat to educate the public on the natural history of this species. The brochure currently available for interpretation of the Elkmont Nature Trail would be revised to include historical information about Elkmont and would emphasize the integration of cultural and natural resource themes. Exhibits would be installed inside the Spence (#42) cabin that would include a historical perspective of this building as well as a history of the establishment and operation of the Little River Lumber Company. While some NPS sponsored programs would still occur within the District at no charge, in Alternative F, additional programs would be offered by the concessioner to individuals staying overnight in lodging accommodations. These programs would be

fee- based and would be provided as an optional activity for visitors. These activities may include in- depth cultural and natural resource education opportunities.

Alternative F would provide the opportunity for the general public to stay overnight inside the Park. It would maintain existing levels of traditional recreation such as hiking, fishing and camping, and provide visitors with additional opportunities to learn about the natural resources that comprise Elkmont, either as a day use visitor or through programs offered for overnight guests. Alternative F proposes to restore and rehabilitate the majority of the buildings, providing a sense of the historical character of the District, and would provide visitors with opportunities to learn about Elkmont's human occupation. For overnight guests, this alternative also includes the option of participation in structured educational programs.

2.2.8.6 Facilities Development with Detailed Site Plans for Alternative F
Under Alternative F, 17 cabins/buildings in Daisy Town, Society Hill and the Appalachian Clubhouse would be restored on the exterior and used for interpretive purposes. The cabins in Daisy Town would be preserved on the interior and the exteriors restored to allow for interpretation. The interior of the Appalachian Clubhouse would be rehabilitated to allow for day use and interior exhibits would provide a self- guiding museum. Cabins that have deteriorated beyond repair would not be retained. The 36 remaining cabins on Society Hill, Millionaire's Row and the Wonderland Club would be restored on the exterior and rehabilitated on the interior for lodging use.

Two options for the Wonderland Hotel and Annex are under consideration in this alternative. Option 1 (F1) includes removal of both buildings and revegetation of the area disturbed during removal. Option 2 (F2) proposes to remove the existing Wonderland Hotel and reconstruct it in a manner representative of its historic configuration in conjunction with restoration of the exterior and rehabilitation of the interior of the Annex. Both buildings would be utilized for public lodging and dining purposes. Foundations and buried features would not be excavated. Following building removal, former building sites would be restored with native species collected from within the District. Restoration would provide soil stabilization and act as a deterrent to erosion and subsequent sedimentation into surrounding water bodies, floodplains, wetlands and other sensitive natural areas.

Specific project implementation requirements for Alternative F include:

In addition to the improvements proposed in Alternative B, F1 proposes to restore and rehabilitate many of the cabins to provide lodging for Park visitors. To accommodate this alternative, there would be a need to provide water and sewer service to these cabins, as well as improved access and parking for the guests staying in those cabins.

In addition to the improvements proposed in F1, F2 proposes to reconstruct the Wonderland Hotel and Annex for overnight guest rental and provide a 100- seat restaurant open to the general public. As described previously, the reconstruction of the Wonderland Hotel and Annex will provide opportunities for educational programs and

for additional exhibits at the hotel. To accommodate these improvements, there would be a need to provide water and sewer service to the Wonderland Hotel and Annex, as well as improved access and parking. Improvements required for Alternative F are as follows:

Water

In F1, eight (8) cabins in Wonderland Hotel, six (6) cabins in Millionaire's Row and twenty- three (23) cabins in Society Hill would be rehabilitated for overnight lodging rental, creating added water (and wastewater) demands. Also, many of the cabins in the Society Hill area are at elevations that are higher than the elevation of the existing water storage tanks and cannot be served by gravity from those tanks. State building codes require that buildings used for overnight lodging be provided with a fire suppression (sprinkler) system meeting the NFPA 13R standard. Therefore, the water supply system provided for this alternative must be capable of meeting that requirement. To accommodate water supply needs for Alternative F1, additional water distribution lines to service the Society Hill cabins, a new booster pump station to aid in forcing water through the lines up Society Hill, rehabilitation of the existing Jakes Creek water tank and addition of a new water supply well and connections to it would be required.

For F2, water system requirements include those specified in Alternative B with the addition of water distribution lines to serve the reconstructed hotel, the Annex, and Wonderland Club cabins; installation of a new booster pump station to distribute water uphill to cabins on Society Hill; rehabilitation of the Jakes Creek water tank; water distribution lines to cabins; and installation of a new water supply well on Millionaire's Row. F2 also requires installation of a fire suppression system meeting the NFPA 13R standard and the water supply system must be capable of meeting that requirement.

Wastewater

Based on the increased wastewater flows associated with F1 and the design capacity of the existing wastewater treatment facility, it would be necessary to provide additional wastewater treatment capacity to accommodate peak daily flows. Requirements to implement F1, over and above those improvements specified for Alternative B, include installation of additional sewer lines and force mains to service cabins specified for lodging use; wastewater treatment plant improvements including construction of a 225 cubic foot flow equalization basin; construction of a drip irrigation system at a suitable location outside of the District to accommodate a 5,000 gpd increase; and installation of sewage grinders and one sewage pump station to serve six (6) cabins east of the Wonderland Hotel. All wastewater system components to be installed under this alternative are listed in Table 2- 22 at the end of this chapter.

The projected wastewater generated under F2 is increased over that generated by F1 because of lodging and food services offered at the Wonderland Hotel and Annex and lodging at the restored cabins on Society Hill. Based on the projected increase in wastewater flows, the design capacity of the existing wastewater treatment facility, and the additional improvements required, as previously described under F1, it would be necessary to provide additional capacity to accommodate peak daily flows entering the wastewater treatment facility. Therefore, in addition to the wastewater modifications

described in F1, F2 requires the following: further expansion of the drip irrigation system at a suitable location outside of the District or construction of a wastewater line extending to the Gatlinburg treatment plant to accommodate an additional 10,000 gpd increase; extension of sewer service lines to the Wonderland Hotel and the Annex.

Roads

Access must be provided to the areas in which cabins are proposed for lodging use. In each of these areas, an all- weather, two- way road must be provided for access. All roadway improvements proposed in F1 have been previously described in Alternative B, with the exception of the following: widening and paving a portion of the existing one-lane road beginning at Elkmont Road near the turnoff to Quarters 434 and 600, and ending at the rear of the Wonderland Hotel; paving a portion of the existing Catron Branch Road from the Wonderland Hotel Parking Lot to the Beaman (58- 8H) cabin, and from the Beaman cabin extending to the Richards (58- 9I) cabin; and placing gravel on the access road from Catron Branch Road to the Paine (58- 2B) cabin.

F2 also requires additional work to provide access to parking areas. As part of F2, it would be necessary to upgrade or replace the existing one- lane bridge over the Little River (across the road from the Wonderland Hotel and north of the modern 434 and 600 quarters) with a new thirty- two (32) foot wide, two- lane bridge, approximately 125 feet long. The bridge would be wide enough to include a walking trail. This work would be followed by widening and paving the existing one- lane road to the new two- lane bridge and to a new parking area north of the bridge. Additional investigations into the condition of the existing bridge must be undertaken to determine all design and construction requirements for rehabilitation or replacement of this structure.

Parking and Access

In comparison to Alternative B, F1 requires additional parking to serve the cabins in the Wonderland Club, Millionaire's Row and Society Hill areas. Given the projected increase in traffic in the Daisy Town and Society Hill areas, a minimum of 30 more parking spaces would be required in this portion of the District. One parking space should be provided for each cabin where overnight lodging is provided. These parking spaces would be provided as close as practical to the cabins they are serving. An additional gravel parking lot would be provided for the Jakes Creek Trailhead in front of the Kuhlman cabin (#40) and would separate users of the Jakes Creek trail from those visiting for other purposes. To allow access to the proposed lodging cabins on Millionaire's Row, while preventing and minimizing uncontrolled site impacts, the road gate on Little River Road would be relocated to the upper end of Millionaire's Row at the Cambier (#49) cabin. An existing gate on Jakes Creek road located south of the bridge crossing Jakes Creek would be relocated to just south of the proposed gravel parking area on Jakes Creek Road.

F2 also must address the need for additional parking adjacent to the Wonderland Hotel. Based on projected parking needs for the Wonderland Club, a total of 163 spaces are required at the Wonderland Hotel for F2, requiring construction of one additional parking lot and increasing the size of another. The new lot would be located adjacent to the east side of the Wonderland Hotel and the overflow lot across the Little River bridge

at the area where air quality monitoring equipment is now located would be expanded to accommodate 110 vehicles. Pathways would be provided from the lots to the hotel.

Other requirements for Alternative F include:

- Provide a visual screen utilizing plant materials relocated from other areas in the District for all proposed parking areas to minimize the visual intrusion of the parking areas into the cultural landscape.
- Repair the footings of a small footbridge over Bearwallow Branch and restore the surface as a safety measure for pedestrians

Primary features of this alternative are summarized in Table 2- 16 on the following page.

2.2.8.7 Estimated Development Costs

The estimated range of costs for site development and implementation of F1 and F2 are provided in Appendix C of this document and includes an itemized list of costs and post- construction O&M costs. Total costs of F1 and F2 are based on estimating the funds necessary to perform the following items:

- Building removal, rehabilitation, restoration, preservation and reconstruction
- Infrastructure improvements
  - Parking lots (improvements and new lots)
  - Road system improvements
  - Water system improvements
  - Wastewater system improvements
- Furniture, fixtures and equipment (associated with buildings for lodging)
- Vegetation management
- Resource education components
- Mitigation measures to be implemented as part of the alternative
- Resource and visitor protection patrols

Table 2- 16: Summary of Implementation Features for Alternative F

Use of Historic Buildings	16 cabins / buildings in Daisy Town, the Chapman cabin and 25 other buildings in Society Hill, eight buildings in Millionaire's Row, nine buildings in the Wonderland Club and the Appalachian Clubhouse retained; Wonderland Hotel and Annex would be removed under F1. Under F2, the hotel would be reconstructed and the Annex rehabilitated for lodging purposes. All other buildings would be removed
Measures for Buildings Retained	Restore exterior to period of significance appearance and preserve interior of Daisy Town cabins; restore exterior of Appalachian Clubhouse and rehabilitate interior to allow for day and self- guiding museum use; restore exterior and rehabilitate interior of cabins retained in Society Hill, Millionaire's Row and the Wonderland Club for lodging purposes. Under F2, restore Annex exterior and rehabilitate interior for lodging; reconstruct hotel for lodging and dining.
Natural Resources Management	Continued implementation of management activities including hemlock management, water quality and fish population assessment, and revegetation of areas where buildings are removed
Visitor Use	An increase in visitation is expected to occur under this alternative. Use of existing hiking trails and other compatible recreational activities such as camping and fishing would continue, but would also require multiple upgrades to infrastructure to accommodate additional water use, wastewater treatment, electrical service and upgrade of roadways to allow for distribution of supplies and services.
Interpretive Features	Up to 14 locations throughout the District with interpretive features including wayside exhibits, an orientation kiosk, brochure, and interior exhibits would be provided, focusing on natural and cultural resources, history of Elkmont, history of Park establishment, and historical perspective of Chapman and Townsend
Access / Circulation	• Relocate road gate on Little River Road to the east end of Millionaire's Row at the Cambier (#49) cabin • Relocate existing gate or install new gate at beginning of Jakes Creek Road • Resurface path in Daisy Town from Appalachian Clubhouse to road to Jakes Creek cemetery • Little River trailhead paving- 350 lf • Daisy Town loop paving – 1,111 lf • Orientation parking area access road - 400 lf • Gravel walking path loop from Little River Trailhead to Spence (#42) cabin - 550 lf • Walking path from Orientation parking lot leading along Elkmont Road to base of Wonderland steps - 550 lf • Road from Elkmont Road to rear of Hotel – 750 lf • One lane asphalt on Catron Branch Road from hotel parking to Beaman (#58- 8H) cabin – 350 lf • Repair one lane gravel Catron Branch Road from Beaman (#58- 8H) to Richards (#58- 9I) cabin – 250 lf • Place gravel on road segment from Catron Branch Road to Paine (#58- 2B)cabin – 300 lf • One lane asphalt at Millionaire's Row to Cambier (#49) cabin - 1167 lf • Path from base of Wonderland steps in vicinity of historic walkway on west side of steps to the top of the steps - 400 lf • Asphalt repair / overlay down Daisy Town Loop Road between Jakes Creek Cemetery Road and Appalachian Clubhouse- 1,111 lf If Wonderland Hotel is reconstructed, include: • Upgrade existing bridge over Little River to two lanes to connect with Wonderland overflow parking area • Walking path from Wonderland overflow parking – 800 lf

Table 2- 16: Summary of Implementation Features for Alternative F (continued)

Parking	6 parking areas proposed; If Wonderland Hotel is reconstructed (F2), include additional parking areas: • Parking area behind hotel; • Increase Wonderland overflow parking area from 75 spaces to 110 spaces
Utilities	Add restroom facilities and sprinkler system to the day use area of the Appalachian Club. Also includes: **Water Supply:** • 1,300 lf 4" water line to Appalachian Clubhouse • 1,750 lf 4" water line from Appalachian Clubhouse to Millionaire's Row • 3,400 lf 4"water line from Jakes Creek cemetery water tanks to Jakes Creek storage tank • Jakes Creek water storage tank rehabilitation with upgraded access road • Water service lines from individual buildings to main water lines • New water supply well and 1,150 lf 4" water pipe to connect to system • Sprinkler system for all buildings used for overnight lodging If Wonderland Hotel is removed, include: 7,500 lf 6" water line to service Wonderland cabins; if reconstructed: 7,500 lf of 8" water line to service hotel and Wonderland cabins; add sprinkler system to hotel and Annex **Wastewater System:** • 640 lf 8"gravity sewer line from Appalachian Clubhouse • 600 lf 8"gravity sewer line serving Wonderland cabins • 4" gravity sewer line from individual cabins to sewer main • 600 lf 2" low pressure sewer force main serving Paine (#58- 2B) cabin • 3,200 lf 3" sewer force main from rear of Wonderland Hotel to existing sewer line in campground • 225 cubic foot flow equalization basin at the wastewater treatment plant • 2,400 lf 3" low pressure force main from Appalachian Clubhouse to Millionaire's Row cabins • 1,200 lf 8" gravity sewer line serving Society Hill cabins • 4" gravity sewer service lines from individual cabins on Society Hill to sewer main • 1,200 lf 3" low pressure sewer force main along Jakes Creek Road from Chapman (#38)cabin serving Kuhlman (#40) and McNabb (#41) cabins on Society Hill If Wonderland Hotel is removed:5,000 gpd drip irrigation system; if reconstructed: 15,000 gpd drip irrigation system or pipe to Gatlinburg 6" gravity sewer service for Wonderland Hotel and Annex
Landscape Treatment	Retain foundations, rock walls and other cultural features where they do not pose a safety hazard to visitors
Park Operations and Staffing	For historic buildings not retained under this alternative, need for resources currently used for stabilization is eliminated; however, operation and maintenance costs would be required to maintain infrastructure serving the buildings retained. Staff time and resources would be required for management of the concessions contract. Concessioner would be responsible for maintenance of buildings used for public lodging.

Table 2- 17: Proposed Disposition of Buildings by Alternative

REQUIRED COMPONENT	Alternative									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
Buildings Retained										
Daisy Town	None	None	12 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse	16 cabins Appalachian Clubhouse
Society Hill	None	None	None	1 cabin	1 cabin	1 cabin	1 cabin	1 cabin	23 cabins 1 garage 1 wood shed 1 privy	23 cabins 1 garage 1 woodshed 1 privy
Millionaire's Row	None	None	None	None	1 cabin	1 cabin	6 cabins 1 garage	6 cabins 1 garage	6 cabins 1 garage 1 gazebo	6 cabins 1 garage 1 gazebo
Wonderland Club	None	None	None	None	6 cabins	6 cabins Hotel Annex	7 cabins	7 cabins Hotel Annex	8 cabins 1 wood shed	8 cabins 1 wood shed Hotel Annex
Buildings Removed										
Daisy Town	All buildings removed: Appalachian Clubhouse 20 cabins 1 rear room	All buildings removed: Appalachian Clubhouse 20 cabins 1 rear room	8 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room	4 cabins 1 rear room
Society Hill	25 cabins 1 garage 1 wood shed 1 privy	25 cabins 1 garage 1 wood shed 1 privy	25 cabins 1 garage 1 wood shed 1 privy	24 cabins 1 garage 1 wood shed 1 privy	24 cabins 1 garage 1 wood shed 1 privy	24 cabins 1 garage 1 wood shed 1 privy	24 cabins 1 garage 1 wood shed 1 privy	24 cabins 1 garage 1 wood shed 1 privy	2 cabins	2 cabins
Millionaire's Row	8 cabins 2 garages 1 gazebo	8 cabins 2 garages 1 gazebo	8 cabins 2 garages 1 gazebo	8 cabins 2 garages 1 gazebo	7 cabins 2 garages 1 gazebo	7 cabins 2 garages 1 gazebo	2 cabins 1 garage 1 gazebo	2 cabins 1 garage 1 gazebo	2 cabins 1 garage	2 cabins 1 garage
Wonderland Club	10 cabins 1 wood shed Wonderland Hotel and Annex	10 cabins 1 wood shed Wonderland Hotel and Annex	10 cabins 1 wood shed Wonderland Hotel and Annex	10 cabins 1 wood shed Wonderland Hotel and Annex	4 cabins 1 wood shed Wonderland Hotel and Annex	4cabins 1 wood shed	3 cabins 1 wood shed Wonderland Hotel and Annex	3 cabins 1 wood shed	2 cabins Wonderland Hotel and Annex	2 cabins
Wonderland Hotel										
Wonderland Hotel Removed	X	X	X	X	X	X	X	X	X	X
Wonderland Hotel Reconstructed						X		X		X
Appalachian Club Day Use			X	X	X	X	X	X	X	X

Table 2- 18: Resource Education Components by Alternative

RESOURCE EDUCATION COMPONENT	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
Orientation Area and Parking										
3- panel Orientation Kiosk across from hotel site containing area and park map.			x	x	x	x	x	x	x	x
Self- guiding brochure provided at orientation kiosk referenced to thematic stops at buildings and other cultural and natural resources throughout the District			x	x	x	x	x	x	x	x
Wonderland Hotel										
(1) Wayside exhibit describing with 2 panels describing: • The hotel and its role in travel and tourism to the District • The conflict between residents of the Elkmont community over whether to establish a National Park or National Forest			x	x	x		x		x	
(1) Wayside exhibit with 2 panels on reconstructed porch describing: • The historic view of the hotel and a description of the scenic vista • Social life at Elkmont and the eventual establishment of the Park						x		x		x
Interior exhibits in lobby describing: • The historic view of the hotel and a description of the scenic vista • Social life at Elkmont and the eventual establishment of the Park								x		x
Elkmont Campground										
(1) Wayside exhibit near existing vending machines with a historical description of the Town of Elkmont		x	x	x	x	x	x	x	x	x
Elkmont Nature Trail										
Revise Trail Brochure to include important natural and cultural history of the District. Including: • A description of the creation of the Park • History of Elkmont, including logging, significant natural features and cultural remnants		x								
Revise Trail Brochure to include important natural history of the District including: • Description and significance of the montane alluvial forest • Description of important natural resource features along the trail			x	x	x	x	x	x	x	x

Table 2- 18: Resource Education Components by Alternative (continued)

RESOURCE EDUCATION COMPONENT	No Action	A	B	C	D1	D2	E1	E2	F1	F2
Millionaire's Row										
(1) Wayside exhibit at Spence (#42) describing Colonel Townsend's role in development of Elkmont					x	x	x	x	x	x
(1) Wayside exhibit at Murphy (#45) cabin describing establishment and operation of the Little River Railroad							x	x	x	x
Interior exhibits at Spence cabin describing: • Importance of the structure relative to Elkmont's history • Establishment and operation of the Little River Lumber Company							x	x	x	x
(1) Wayside exhibit describing the natural history of the species of synchronous firefly in the District		x	x	x	x	x	x	x	x	x
Society Hill										
(1) Wayside exhibit at the Chapman (#38) cabin describing Chapman's role in establishing the Park				x	x	x	x	x	x	x
Daisy Town										
(1) Wayside exhibit at the Mayo (#7) cabin describing District architectural features			x							
(1) Wayside exhibit near the Daisy Town mailboxes describing the story of Park establishment			x							
(1) Wayside exhibit providing an orientation to Daisy Town and a description of the District as a summer resort community				x	x	x	x	x	x	x
(1) Wayside exhibit looking up the Daisy Town streetscape from the Appalachian Clubhouse providing a historical perspective on community life at Elkmont			x	x	x	x	x	x	x	x
(1) Wayside exhibit near the Appalachian Clubhouse with building history			x	x	x	x	x	x	x	x
(1) Wayside exhibit west of the Appalachian Club describing the history of the train station and railroad at Elkmont			x	x	x	x	x	x	x	x
Interior exhibits in Appalachian Clubhouse serving as a self- guiding museum and exhibits would add to the story provided by other interpretive exhibits			x	x	x	x	x	x	x	x
Interpretive programs provided by NPS focusing on natural and cultural history themes of the area.					x	x				

Table 2- 19: Alternative Summary by Attribute

	ALTERNATIVE									
REQUIRED COMPONENT	No Action	A	B	C	D1	D2	E1	E2	F1	F2
# Cabins Retained Only for Interpretive Uses	0	0	12	17	18	18	17	17	17	17
# Cabins Retained for Visiting Scientist Housing	0	0	0	0	6	6	6	6	0	0
# Cabins Retained for Public Lodging Purposes	0	0	0	0	0	0	7	7	36	36
# Interpretive Exhibits	0	2	10	10	10	11	10	12	10	12
Upgraded Electrical Service Required			X	X	X	X	X	X	X	X
Sprinkler Systems (Wet)			X	X	X	X	X	X	X	X
Sprinkler System (Dry)						X				
Parking and Access*										
Orientation Area (12 spaces; 720 SY)			X	X						
Orientation Area (25 spaces; 1500 SY)					X	X	X	X	X	X
Little River Trailhead (30 spaces; 1800 SY)			X	X	X	X	X	X	X	X
Appalachian Clubhouse (24 spaces; 1440 SY)			X	X	X	X	X	X	X	X
Daisy Town / Jakes Creek Trailhead (40 spaces; 2400 SY)			X	X	X	X	X	X		
Behind Wonderland Hotel (50 spaces; 3000 SY)						X		X		X
Wonderland Overflow (75 spaces; 4500 SY) (110 spaces in F2; 6600 SY)								X	X	X
Daisy Town (40 spaces; 2400 SY)									X	X
Gravel Parking for Jakes Creek Trailhead in front of Kuhlman Cabin (#40) (20 spaces; 1200 SY)									X	X

*SY = square yard

Table 2- 20: Estimated Water Required and Wastewater Generated for All Alternatives

	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
Daily Average Visitation Projected (number of day use visitors, excluding public lodging and visiting scientists)	500	500	500	500	526	526	526	526	536	536
# Visiting Scientists Housing in Cabins	0	0	0	0	18	18	22	22	0	0
# Public Lodging in Cabins	0	0	0	0	0	0	57	57	226	226
Water Required for Visiting Scientists (gpd)	0	0	0	0	1,125	1,125	1,375	1,375	0	0
Water Required for Cabin Public Lodging (gpd)	0	0	0	0	0	0	4,275	4,275	16,950	16,950
Water for Day Use at Appalachian Clubhouse (gpd)	0	0	1,625	1,625	1,710	1,710	1,710	1,710	1,742	1,742
# Lodgers in Hotel and Annex	0	0	0	0	0	0	0	52	0	52
Water for Wonderland Hotel and Annex (gpd)**	0	0	0	0	0	0	0	3,900	0	3,900
Water for Restaurant at Wonderland Hotel (gpd)**	0	0	0	0	0	0	0	5,000	0	5,000
Water for Public Restroom at Wonderland Hotel (gpd)	0	0	0	0	0	1,710	0	1,710	0	1,742
Total Water Required (gpd)**	0	0	1,625	1,625	2,835	4,544	7,360	17,970	18,692	29,334
Total Wastewater Generated (gpd)*	0	0	1,300	1,300	2,268	3,635	5,888	14,376	14,954	23,467

gpd=gallons per day
* assumes water required is 1.25 x the amount of wastewater generated. Wastewater generated by visiting scientists = 50 gpd; public lodging visitors = 60 gpd; each visitor to the restaurant = 40 gpd; **E2 and F2 both assume maximum capacity at restaurant for calculation of water requirements

Table 2- 21: Proposed Water Supply System Improvements by Alternative

	ALTERNATIVE									
Description of Proposed Improvement	**No Action**	**A**	**B**	**C**	**D1**	**D2**	**E1**	**E2**	**F1**	**F2**
7,500 LF 8" water line to Wonderland Club from existing Jakes Creek Cemetery water storage tanks, through Campground, across Little River bridge and along Elkmont Road to rear of Wonderland Hotel						X		X		X
7,500 LF 6" water line to Wonderland Club from existing Jakes Creek Cemetery water storage tanks, through Campground, across Little River bridge and along Elkmont Road to rear of Wonderland Hotel					X		X		X	
1,750 LF 4" water line from the Appalachian Clubhouse, along Daisy Town Loop Road and Little River Road to Millionaire's Row cabins (to remain)							X	X	X	X
1,300 LF 4" water line from existing Jakes Creek Cemetery water storage tanks, across Jakes Creek bridge and down Daisy Town Loop Road to Appalachian Clubhouse			X	X	X	X	X	X	X	X
Water service lines from individual buildings to water main					X	X	X	X	X	X
3,400 LF 4" water line from Jakes Creek Cemetery water storage tanks, across Jakes Creek bridge and along Jakes Creek Road to Jakes Creek storage tank									X	X
New water supply well and 1,150 LF 4" piping located above Cambier (#49) cabin on Millionaire's Row with a water line connecting to water system near the cabin							X	X	X	X
New booster pump station and well to supply water to Society Hill cabins									X	X
Jakes Creek water storage tank rehabilitation with upgraded access road									X	X

LF = lineal feet

Table 2- 22: Proposed Wastewater System Improvements by Alternative

Description of Proposed Wastewater System Improvement	ALTERNATIVE									
	No Action	**A**	**B**	**C**	**D1**	**D2**	**E1**	**E2**	**F1**	**F2**
640 LF 8" gravity sewer line from Appalachian Clubhouse to existing manhole in Elkmont Campground (40 LF sewer line under Jakes Creek)			X	X	X	X	X	X	X	X
600 LF 8" gravity sewer line along Catron Branch Road Serving Wonderland Club cabins					X	X	X	X	X	X
1,200 LF 8" gravity sewer line along Jakes Creek Road and Daisy Town Loop Road to Appalachian Clubhouse serving Society Hill cabins									X	X
4" gravity sewer service lines from individual cabins to sewer main for Wonderland Club cabins					X	X	X	X	X	X
6" gravity sewer service lines for Wonderland Hotel and Annex						X		X		X
4" gravity sewer service lines from individual cabins to sewer main for Society Hill cabins									X	X
600 LF 2" low pressure sewer force main along Catron Branch Road serving Paine cabin in Wonderland Club					X	X	X	X	X	X
2,400 LF 3" low pressure sewer force main from Appalachian Clubhouse along Daisy Town Loop Road and Little River Road serving Millionaire's Row cabins							X	X	X	X
3,200 LF 3" low pressure sewer force main from rear of Wonderland Area along Elkmont Road, across Little River bridge to existing sewer line in Elkmont Campground					X	X	X	X	X	X
1,200 LF 3" low pressure sewer force main along Jakes Creek Road from Chapman (#38) cabin serving Kuhlman (#40) and McNabb (cabins on Society Hill									X	X
225 square foot flow; 6000 gallon capacity flow equalization basin at the wastewater treatment plant (outside east side of existing fence)					X	X	X	X	X	X
Sewage pump station from Wonderland Club					X	X	X	X	X	X
Grinder pumps behind cabins used for lodging					X	X	X	X	X	X
5,000 gpd wastewater treatment expansion through drip irrigation system in a suitable location outside of the District or piping to Gatlinburg								X	X	
15,000 gpd wastewater treatment expansion through drip irrigation system in a suitable location outside of the District or piping to Gatlinburg										X

gpd = gallons per day
LF = lineal feet

Table 2- 23: Proposed Roadway Improvements by Alternative

Description of Proposed Roadway Improvement	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
350 LF second lane construction along Little River Road at Little River Trailhead parking area in Millionaire's Row			X	X	X	X	X	X	X	X
1,111 LF asphalt repair / overlay down Daisy Town Loop Road between Jakes Creek Cemetery Road and Appalachian Clubhouse			X	X	X	X	X	X	X	X
1,167 LF one lane road at Millionaire's Row to Cambier cabin										
750 LF two lane asphalt road from Elkmont Road to rear of Wonderland Hotel					X	X	X	X	X	X
350 LF one lane asphalt on Catron Branch Rd. from Wonderland parking lot to Beaman cabin					X	X	X	X	X	X
300 LF gravel overlay from existing roadway to Paine cabin					X	X	X	X	X	X
500 LF One lane asphalt on Catron Branch Road from Beaman cabin to Richards cabin									X	X
400 LF One lane road through Orientation parking area across Elkmont Road			X	X	X	X	X	X	X	X
New two- lane bridge over Little River to Wonderland overflow parking area								X		X
550 LF loop gravel walking path from Little River Trailhead to Spence cabin and returning to Little River trail in Millionaire's Row					X	X	X	X	X	X
550 LF walking path from Orientation parking lot along northern edge of Elkmont Road to base of Hotel steps			X	X	X	X	X		X	
800 LF walking path from Orientation and Wonderland overflow parking lots along northern edge of Elkmont Road to base of hotel steps								X		X
400 LF walking path from base of Wonderland steps in vicinity of historic walkway on the west side of the steps to top of Wonderland steps			X	X		X		X		X
Relocate road gate on Little River Road to upper end of Millionaire's Row (at Cambier cabin)									X	X
Relocate road gate on Little River Road to east end of Little River Trailhead parking area			X	X	X	X	X	X		
Relocate gate or install new gate on Jakes Creek Road to just south of Jakes Creek Cemetery Road			X	X	X	X	X	X		
Relocate gate on Jakes Creek road to just south of proposed gravel parking area									X	X
Bank stabilization at existing culverts			X	X	X	X	X	X	X	X

LF = lineal foot

2.3 Preferred Alternatives

The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) require that the Record of Decision specify an "environmentally preferred" alternative and an "agency preferred" alternative (40 CFR 1505.2(b)).

According to the regulations, the environmentally preferred alternative is the alternative that would result in the least damage to the biological and physical environment, but that best protects, preserves, and enhances historic, cultural and natural resources. The environmentally preferred alternative is determined by applying criteria in the requirements identified in Section 101 of NEPA to each alternative under consideration. These requirements include:

1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;
5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative can be the same as the agency preferred alternative, but may differ in some respects, depending on the results of the analysis presented in the Environmental Impact Statement. The agency preferred alternative is the alternative that the NPS believes best fulfills the purpose and need of the proposed action. As a result, the environmentally preferred and agency preferred alternatives do not necessarily need to be the same alternative because the NPS must consider other issues in choosing its preferred alternative, such as the agency's mission and responsibilities in managing resources, and other economic, environmental, technical and social factors.

Alternative C represents both the environmentally preferred and agency preferred alternative for the Elkmont Historic District. This alternative emphasizes the preservation and protection of important historic, cultural and natural aspects of our national heritage while maintaining an environment that supports diversity and variety of individual choice. The proposed visitor facilities and services would have the least possible impact on resources while ensuring that visits to the site would take place in safe, healthful, productive and aesthetically and culturally pleasing surroundings. At the same time, Alternative C would achieve a balance between human population and resource considerations.

3.0 AFFECTED ENVIRONMENT

3.1 Cultural Resources

This section presents a brief overview of the cultural history of the area and a description of the cultural resources within the District. Much of the following text is taken from the 1993 National Register of Historic Places nomination form for Elkmont (Thomason et al. 1993), the 2002 baseline report entitled "Cultural Resources of the Elkmont Historic District, Great Smoky Mountains National Park, Sevier County, Tennessee" (Cleveland et al. 2002), and from follow- up cultural resource investigations conducted in 2003 and 2004 to provide additional baseline information for use in impact analysis (Webb and Benyshek 2004). The cultural resources of the District are of three primary types: prehistoric and historic archeological resources (below ground evidence of human occupation), historic buildings, and other structures and cultural landscape features.

3.1.1 Site Prehistory and History

Environmental Setting

The current environmental setting of the District is described in detail in Section 3.2 of this document. However, to facilitate an understanding of the cultural history, it is important to understand the environmental setting and climate before and during human settlement. The District is located in a mountain valley and on adjacent slopes of the Appalachian Summit region in the Southern Blue Ridge physiographic province. It is characterized by rugged terrain, heavily forested slopes, and rushing streams with waterfalls. Today, its climate is humid and temperate. Temperatures were considerably colder in the southeast during the last glacial period (ca. 23,000—13,000 B.P.) and the landscape was covered with a boreal, northern coniferous forest dominated by pines and spruce. It is estimated that when the first known humans arrived in North America (ca. 18,000- 13,000 B.P.), the climate had warmed, precipitation increased, and the forest overstory at the lower elevations was composed of northern hardwood trees. From 6,000 to 3,000 B.P., another climate change occurred, referred to as the Hypsithermal, which is generally considered a period of continued warming and, possibly, less precipitation. Since that time, the climate has cooled somewhat, allowing for conditions that support different vegetation zones at various elevations.

Currently, a variety of forest types are found in the District and are dominated by species such as white pine, eastern hemlock, oak species, hickory and tulip tree. In addition, some areas include montane alluvial forest, a temporarily flooded cold- deciduous forest found typically on mid- elevation mountainous floodplains. Elkmont represents a higher elevation variant of this forest type. Montane alluvial forest is a relatively rare forest type due to the scarcity of well developed, broad floodplains in mountainous regions. This forest type is also rare because many floodplains in the region have been converted to agricultural areas or developed for other uses. Cove mixed hardwoods and oak hardwoods are often found on the adjacent slopes. The range of flora found in each of these forest types provided diverse habitats and support a variety of wildlife species, including white- tailed deer, black bear, bobcat, gray fox, beaver, otter, several squirrel species, turkey, and fish. Complete descriptions of vegetation communities of the District are provided in Section 3.2.2 of this document.

Table 3- 1: Generalized Cultural Chronology for Elkmont and the Appalachian Summit Region

Period	Phase or Subperiod	Chronology	Comments
Euro- American	Great Smoky Mountains National Park	1930s- present	Development of Elkmont Campground and other facilities
	Resort- Era (Elkmont)	Ca. 1910- 1934	Development of Wonderland Club, the Appalachian Club and resort cabins
	Railroad Logging	Ca. 1908- 1926	Intensive Little River Lumber Company logging of East Prong Little River; beginning of development of Town of Elkmont
	Settlement	1800s- 1830s	Ownby, Trentham, and other occupations along Little Rive and Jakes Creek
	Exploration and Early Settlement	Ca. 1750- 1800	Early exploration; no known occupation of Elkmont area
Historic Cherokee	Late Qualla	Ca . A.D. 1650- 1838	
	Early/Middle Qualla	Ca. A.D. 550- 1650	
Mississippian	Mississippian I (Tennessee)/ Pisgah (North Carolina)	1000- 550 B.P.	
Late Woodland	Undifferentiated	1500- 1000 B.P.	Possible Late Woodland manifestations include Hamilton, Cane Creek, and late Connestee materials
Middle Woodland	Connestee	1800- 1500 B.P.	Continues into Late Woodland period
	Woodland II (Tennessee)/ Pigeon (North Carolina)	2200- 1600 B.P./2500- 1800 B.I	Elkmont Sites 40SV120, 40SV166
Early Woodland	Woodland I (Tennessee)/ Swannanoa (North Carolina)	2900- 2200 B.P./3000- 2500 B.	
Late Archaic	Savannah River	5000- 3000 B.P.	Elkmont Site 40SV125
Middle Archaic	Guilford	6000- 5000 B.P.	
	Morrow Mountain	7500- 6000 B.P.	Elkmont Site 40SV125
	Stanly	8000- 7500 B.P.	
Early Archaic	LeCroy	8900- 8000 B.P.	
	Kirk	10,000- 8900 B.P.	
Paleoindian	Late	10,500- 10,000 B.P.	
	Middle	10,900- 10,500 B.P.	
	Early	11,500- 10,900 B.P.	
Pre- Paleoindian		40,000- 11,500 B.P.	Hypothesized early occupation of Eastern North America

Prehistoric Overview

Human occupation in the Appalachian Summit is divided into seven chronological periods: Pre- Paleoindian (40,000- 11,500 B.P.), Paleoindian Period (11,500- 10,000 B.P.), Archaic (9,500- 3000 B.P.), Woodland Period (3000- 1000 B.P.), Mississippian Period (1000- 550 B.P.), Historic Cherokee (550 B.P. – 1838), and Euro- American (1750 – present). Table 3- 1 illustrates the generalized cultural chronology of Elkmont. Human occupation in this region is evidenced by technology, settlement patterns, subsistence practices, population density, social organization, ideology and other cultural components.

Paleoindian Period

Documented human settlement is known from prior to 12,000 years B.P. elsewhere in the Eastern U.S., but none of these earliest Pre- Paleoindian human occupations have been found in the Appalachian Summit. Research in the Southeast has revealed evidence of human occupation from about 11,500 B.P. While evidence of Paleoindians has been found in Tennessee, there is sparse distribution of their remains in the Appalachian Summit. To date, no evidence of Paleoindian culture has been found within the District.

Archaic Period

The Archaic period in the Appalachian Summit can be divided into three subdivisions: Early (10,000–8000 B.P.), Middle (8000–5000 B.P.) and Late (5000–3000 B.P.). These divisions are largely recognized and based on temporal changes in style of projectile points. Both Middle and Late Archaic site components have been found within the District.

Woodland Period

The Woodland period in the Appalachian Summit is divided into three sub- periods: Early (3000–2500 B.P.), Middle (2500–1500 B.P.) and Late (1500–1000 B.P.). The Woodland period most likely marks a gradual transition in both subsistence and settlement patterns because a deciduous forest environment, similar to that found in the Archaic period, was exploited. Various tools introduced in the Archaic period, such as drills, wedges, hoes, nutting stones, pestles and awls, also appear in the archeological record of the Woodland period. The Woodland period in the Appalachian Summit is also marked by the beginnings of pottery making and the introduction of the bow and arrow. No Early or Late Woodland occupations are known from the District, but evidence of Middle Woodland occupations has been found at two locations.

Mississippian Period

The Mississippian period has been the subject of much research throughout the Southeast. In the eastern part of the Appalachian Summit, this period is marked by the Pisgah phase (1000- 550 B.P.), but it is currently believed that the Pisgah phase did not make a significant cultural impact in the North Carolina or Tennessee mountains west of the Tuckasegee drainage. It has been suggested that an early Qualla (Historic Cherokee or Lamar) phase culture was thriving at about the same time Pisgah influence was being felt in the central part of the Appalachian Summit. Other Mississippian manifestations are also present in the Tennessee and Little Tennessee valleys west and southwest of Elkmont, including the Hiwassee Island and Dallas phases.

Historic Cherokee

The Cherokee Indians occupied the Appalachian Summit region at the time of the earliest European exploration (Hernando de Soto's expedition in 1540) and had likely been resident in the area since at least the mid- fifteenth century. The historic Cherokee occupation is known archeologically as the Qualla phase (ca. A.D. 1450–1838) and can be divided into earlier (ca . A.D. 1450–1650) and later (ca .A.D. 1650–1838) periods. The late Qualla phase (ca. A.D. 1650–1838) is marked by the increasing appearance of European goods at Cherokee sites, as well as shifts from typical Mississippian structure forms to more Euro- American style architecture. The overall settlement pattern for this phase changed during the latter part of the eighteenth century from nucleated towns or villages, to one characterized by loosely grouped houses, usually set in a linear pattern. By the early nineteenth century, most Cherokees were living in Euro- American style log cabins. Late Qualla ceramics are generally similar to those of the early Qualla phase, although there are significant differences in the representation of specific vessel forms and decorative motifs. European- made items like glass trade beads, iron tools and utensils, guns, glass bottles, and copper kettles were introduced into the artifact assemblage.

Historic Overview (Euro- American, 1750–present)

Late- eighteenth- century Euro- American settlements in Sevier County and the rest of East Tennessee generally were located on the flat and accessible lands along the main rivers and larger creeks. Several fortified homesteads, or "stations," were established in the area during this period, primarily along the larger drainages. Sevier County was established in 1785, and in 1795, the county seat was moved to Sevierville. Settlement of the more mountainous interior of the region, including Elkmont, did not begin until well into the nineteenth century. By the 1830s, the Ownby and Trentham families owned and farmed land along Jakes Creek in Elkmont.

Elkmont was important to both the railroad and lumbering operations of the area. The history of logging on the East Prong of the Little River (which includes the District) follows the pattern seen elsewhere in the Smoky Mountains. The earliest logging occurred between about 1880 and 1900, and was characterized by selective cutting in areas most easily reached by the logger. Early logging near Elkmont apparently focused on poplar and ash, but also included some cutting of cherry and basswood. In the early 1900s, ox teams were used to log portions of the Blanket Creek and Jakes Creek drainages. Soon thereafter, the railroad at Elkmont began to take the place of ox teams in transporting harvested lumber from the area.

Large- scale railroad (or mechanical) logging began in the Elkmont area in the early 1900s, when the Little River Lumber Company began to purchase property in the vicinity. The company built a large band mill at Townsend, in Tuckaleechee Cove southwest of Elkmont, and by 1908 had extended a railroad line through the Little River's narrow East Prong gorge to Elkmont. The community of Elkmont soon developed and included a hotel, post office, commissary, church, railway yard, machine shop, coaling dock, and a variety of cabins for management and workers. Most of the buildings were located on and near the broad floodplain of the Little River, primarily within the area of the present- day Elkmont Campground. Establishment of the railroad facilitated the intensive logging period at Elkmont, beginning in 1908 and ending in 1926, overlapping the first two decades of the Elkmont resort era.

The Resort Era at Elkmont (1910–1934)

The following six page description of the resort era at Elkmont is primarily excerpted from the National Register of Historic Places nomination form for Elkmont (Thomason et al. 1993). This description provides an abbreviated history of the period from 1910 to 1934:

> The scenic beauty and moderate climate of the southern Appalachian Mountains have long attracted visitors, particularly in the summer months. However, the difficulty of transportation through the mountains in the nineteenth century limited the type of visitors and the areas able to be developed for summer visitation. Soon after the construction of the Buncombe Turnpike in the 1820s, which connected Greeneville, Tennessee to Greenville, South Carolina, summer colonies of wealthy South Carolinians developed in the North Carolina mountains, south and east of the Great Smoky Mountains. The purported healthy climate of the mountains was a particular lure for visitors during the middle to late nineteenth century.
>
> Various types of health resorts, many located on springs, were established in western North Carolina and East Tennessee. One of the earliest resorts constructed in Sevier County was Henderson Springs, known as a health retreat as early as the 1830s. A two- story frame hotel and 22 cabins were built later in the 19th century, attracting the patronage of prominent Knoxville families.
>
> The construction of railroads vastly enhanced the potential of the Great Smoky Mountains region for recreational purposes, particularly for those with more moderate incomes. Knoxville was accessible by rail prior to the Civil War, but rail lines did not extend into Sevier County until after the turn of the century. While resorts did develop prior to building of the railroad in this area, they were located along more accessible roads or water routes. An advertisement in an 1897 edition of the *Knoxville Journal* for Dupont Springs, located 12 miles west of Sevierville, touted not only its three kinds of water, but also its "cool and invigorating" air and "unequaled" scenery. Visitors were advised to travel by boat or horseback to Sevierville. However, the more remote areas of the Great Smoky Mountains remained out of the reach of most summer visitors until after 1900.
>
> The construction of railroads also allowed the timber resources of the southern Appalachians to be utilized commercially. After 1900, large northern timber companies, facing depletion of the timberlands in the northeast and the Great Lakes, moved into the Great Smoky Mountains and began to develop the infrastructure needed to extract timber. Among the several large timber companies that worked within the Great Smoky Mountains was the Little River Lumber Company. In 1901, under the direction of the General Manager, Colonel W. B. Townsend, the company began to purchase land in East Tennessee. The Little River Lumber Company was especially interested in cutting hardwoods and hemlock at the higher elevations. To enable them to extract this wood, they created the Little River Railroad Company. Chartered in 1901, it operated until it was dissolved in 1940.
>
> The Little River Railroad Company recognized the opportunity to use the railway for multiple purposes. An observation car was added to the lumber train for

passengers who wished to view the scenery along the Little River and by 1909, daily train service was available from Knoxville's Southern Station to Elkmont. The lumber company not only encouraged, but promoted development of land that was logged. In 1910, the Little River Lumber Company deeded the Appalachian Club 50 acres "more or less" along Jakes Creek just upstream from Elkmont. The lumber company retained timber and mineral rights, while the Appalachian Club was granted the right "to construct at its own expense, a club house for the accommodation of members and guests, and the right or privilege, of constructing such cottages, or cabins, by itself, or by its members as may be desired" (Sevier County 1910).

Within the District, the Appalachian Club was a Knoxville- based social club. A 1915 brochure describes the Appalachian Club as "composed principally of Knoxville businessmen, for the purpose of providing a place for recreation and rest for themselves". In 1919, the club was reconstituted and formally incorporated as the New Appalachian Club, with its headquarters in Knoxville and its principal clubhouse at Elkmont (Sevier County 1919). Club members were able to buy lots, and rooms in the original clubhouse were deeded to individuals for personal ownership. Membership in the Appalachian Club and the New Appalachian Club included a banker (J. Wylie Brownlee), a university professor (R.C. Matthews), several attorneys (including Forrest Andrews and James B. Wright) and two members associated with the Little River Lumber Company or the Railroad (General Manager Col. W. B. Townsend and Railroad Superintendent J. P. Murphy). Wright, Townsend, Murphy and Brownlee were all cabin owners by 1919.

While predominantly based in Knoxville, members of the Appalachian Club also came from other places in the South. Testimony by H. E. Wright in 1933 noted that, "we have located at Elkmont now 65 summer homes owned by the very best citizens of Knoxville, some from Memphis, some from Athens, some from Nashville, and some from Kentucky, and other places". However, most of the former cottage owners at the Appalachian Clubs, and at the later Wonderland Club, who became leaseholders within the Park, were from Knoxville. Their Knoxville business affiliations included Richards Loan Company, Bowman Hat Company, Price- Baumann Tire, Swan Brothers Bakery and Galyon Lumber. The Little River Lumber Company maintained a legal affiliation with the club until 1930 when a quit claim was filed, thereby ending all formal connections.

One year after the establishment of the Appalachian Clubhouse, the Little River Lumber Company deeded to C. B. Carter a tract of land immediately downstream from the Town of Elkmont. Carter and his brothers founded the Wonderland Park Company and the next year purchased an adjacent tract of land from the lumber company. Construction of the Wonderland Hotel began in the spring of 1912, and the hotel was ready for business by June 15 of that year.

After construction of the Appalachian Club and Wonderland Hotel, a daily passenger train, the Elkmont Special, ran from Knoxville up the Little River to its final three stops that were just minutes apart at the Wonderland Park Hotel, Elkmont, and the Appalachian Club. The trip took approximately two and one-half hours from Knoxville. The Little River Railroad and the Knoxville and

Augusta Railroad also promoted "Elkmont Country" through brochures. A 1914 brochure assured the reader that besides being noted for its beautiful scenery, Elkmont Country "is becoming more popular each year as a recreation place for people from all over the South, some of whom have built summer cottages so they and their families may spend the summers in one of the most delightful mountain climates in the entire country." In the same brochure, the Appalachian Club was described in the following terms:

> The Appalachian Club . . . has made extensive improvement on its club house and annex since last year, and is now in position to serve its members better than ever before. A complete water and sewerage system has been installed, also a new and up- to- date electric light plan. Here, situated at an elevation of twenty- five hundred feet above sea level and commanding a magnificent view of the Smoky Mountains, some forty or fifty cottages have been built by members of the club. The natural surroundings of the cottages are so beautiful that the possibilities for enhancing the natural beauties are manifold, and this is one of the charms of the place. On the west side of Townsend Avenue flows a tumultuous little mountain stream which furnishes running water in each summer home, and the cottages, rustic and simple, can boast of bath rooms, shower baths and sewer connections together with a natural swimming pool near the club house.

Wonderland Park is described in equally glowing terms in a 1915 brochure:

> One of the most beautiful recreation places in the Elkmont country. Elevation two thousand five hundred feet. Hotel new and modern, situated in the heart of the Great Smoky Mountains. Wonderland Park is noted for its picturesque scenery, with river and mountains in delightful vista. A number of rustic cottages have been built here, which add to the attractiveness of the place. Excellent mountain and rainbow trout fishing in Little River. Horseback riding, bathing and mountain climbing. Accommodations for two hundred guests …

While the Wonderland Park Hotel was fairly typical of the resorts of the day, the owners of the Wonderland Park Company (the Carter brothers from Knoxville) had land speculation in mind. The original plat for Wonderland had more than 650 tracts, and the Wonderland Park Addition had thousands more. The land that cost $5 per acre or less was subdivided into 16 lots per acre. Had it actually been built, Wonderland Park would have had the density of a major city for its time. However, even if the grid of streets had been laid, many of the tracts were too small and located on sites not suitable for building.

The President of the Wonderland Company himself sold land through agents in Orlando, Florida. Aside from the hotel and annex, less than twenty buildings were built at Wonderland. Many of the purchasers of land, in fact, never saw the tracts they had bought. It was not until decades later, after creation of the National Park, that some of the business practices of the Carter brothers became known. After the Carters conveyed this land at Elkmont to the Great Smoky Mountains Conservation Association, the deeds and title papers of all prior lot

owners in this section were canceled, since the Carters had possession of the land and the location of the owners of the tracts were unknown. However, even those who had clear title seldom recouped their purchase price and taxes in the creation of the Park. Many were notified that their tracts were only 25- by- 100 feet and were on the side of a hill or mountain. Generally, they were offered from $2 to $25 for each tract, depending on location.

Due to the legal problems it created, the activities of the Wonderland Park Company were short- lived. By 1913, legal disputes developed between the Carter brothers and the subsequent lawsuit dragged on for a number of years during which time the defendant, T. M. Carter, died. In 1915, the Wonderland Park Hotel and immediately adjacent lands and buildings were sold to a group of Knoxville citizens who formed a private club, similar in nature to the Appalachian Club. Both clubs operated hotels that were available to members but were apparently also rented to paying guests. In 1920, the Wonderland Club built the hotel annex that provided additional rooms for club members. The Appalachian Club Hotel burned down in 1933 and one year later was replaced by another club house that still stands today.

For almost a decade and a half, recreational and industrial use of the East Prong of the Little River existed side by side. The train from Knoxville made day trips to Elkmont possible. Some stayed at the hotels for short periods, while club members often made extended visits. Passengers could debark at the imposing frame hotel on the hill. The next stop was the town of Elkmont. The final passenger stop was the Appalachian Club Station, where visitors would cross the creek on a footbridge to the Clubhouse. Just beyond the Appalachian Club Station, geared engines (also called Shay type locomotives) replaced the piston-driven locomotives and continued up the steep hills to where lumber operations were occurring.

It should be noted that industrial and recreational users of the East Prong of the Little River were not mutually exclusive groups. Several members of the Appalachian Club were at some point connected to the Little River Lumber Company. Furthermore, in 1928, a 65- acre tract of land belonging to the Little River Lumber Company, adjacent to the Appalachian Club holdings, was deeded to Alice U. Morier, who had married the aging Colonel Townsend. Townsend had been listed as a lot owner in 1919. These properties, adjacent to the Appalachian Club along Millionaire's Row, were not part of the original Appalachian Club deed, but were later included in the negotiation of leases with the Park.

By 1923, much of the accessible timber above the East Prong had been removed, and the lumber company began to focus its efforts on its operations on the Middle Prong. The train to Elkmont was discontinued in 1925 and the tracks were dismantled. In 1926, a gravel road was built through the gorge from Townsend to Elkmont, providing an easier route than the steep mountain road from Gatlinburg through Fighting Creek Gap. The development of roads into Elkmont in the mid- 1920s reflects increasing automobile ownership. Many of the cottage owners had been driving as far as Townsend and taking the train from there to Elkmont. Auto- tourism eclipsed the importance of the railroad in the

development of the southern mountains for recreational purposes and was later to be a major contributing factor in the creation of the Park. The road from Townsend to Elkmont and on to Gatlinburg was part of the one- hundred- mile scenic loop that began and ended in Knoxville. This road, which still exists today, passes through Maryville, Walland, Elkmont, Pigeon Forge, and Sevierville, and along a portion of the route of present day I- 40. The section of the roadway from Townsend to Gatlinburg is within the Park.

Tourism grew and some of the buildings within the town of Elkmont were bought and improved to meet the needs of tourists and visitors to the Wonderland and Appalachian Clubs arriving by bus and private car. In 1927, hotel rooms at the Wonderland Park rented for $2.50 per day, but visitors renting for a week at a time paid a daily rate that was even lower. Cabins also were available for rent (Thomason et al. 1993). At the Appalachian Club, residents and visitors stayed in cabins and dined at the clubhouse. Some residents brought their servants along for the summer. Recreation at both locations included hiking, picnicking, horseback riding, outdoor games like horseshoes and badminton, and formal and informal dances. One popular spot during the summer was the swimming hole that formed behind a dammed area of the Little River near the Appalachian Club.

Construction of cabins continued through the 1920s. By 1931, 19 cabins were located at Wonderland. At the Appalachian Club, a number of cabins were also built during the 1920s. Some 75 cabins were present in the two areas just prior to the Depression. A few cabins were built in the 1930s, most notably those built by Mrs. Alice Townsend along the Little River. The Elkmont area in the early 1930s consisted of the cabins, hotel, clubhouse, the small community of Elkmont, and a few mountain farmsteads. When the community of Elkmont was created around 1908, a cemetery was also established. Located north of the Wonderland Hotel, it was the only cemetery in the area. In 1928, a new Elkmont Cemetery was dedicated adjacent to the Appalachian Club. This cemetery was donated by Levi Ownby [correction to original nomination should read Levi Trentham] in memory of his wife.

The enthusiasm that led to the growth of the Appalachian and Wonderland Clubs was one of the forces behind the movement to create either a National Forest or National Park in the Great Smoky Mountains. The movement started in Tennessee and later was embraced by supporters in North Carolina. Knoxville businessmen, along with the Chamber of Commerce and the Knoxville Automobile Club, launched the campaign. In 1923, the Great Smoky Mountains Conservation Association was formed. Initially, its concern was more with building roads than creating a park or forest preserve. In 1926, Congress passed a law authorizing the creation of two National Parks in the Appalachians (Great Smoky Mountains and Shenandoah National Parks) and stipulated that land would be acquired by the states involved. After eight years of land acquisition, the Park was finally established in 1934; it was formally dedicated by President Roosevelt in 1940.

Major players on both sides of the issue of park establishment were associated with Elkmont. Governor Austin Peay, who spearheaded the purchase of the first

large tract of land for the Park, was a member of the Wonderland Club. Mr. and Mrs. Willis P. Davis and Colonel David Chapman were some of the organizers of the Conservation Association, along with J. Wylie Brownlee and attorneys Forrest Andrews and James B. Wright. Wright, who supported the establishment of a National Forest, but not a National Park, resigned from the Conservation Association and became one of the park movement's strongest foes.

Despite the role several members played in the Great Smoky Mountain Conservation Association, many in the Appalachian Club eventually opposed condemnation of land for the Park, possibly when they discovered that their properties would be among those condemned. They retained James Wright to represent their interests. In 1932, faced with political opposition particularly by members of the Appalachian Club, Congress consented to a plan in which landowners could be offered long- term leases. As a result, Appalachian and Wonderland Club properties were acquired from the members for one- half of the appraised value, plus a lifetime lease. Some cabin owners chose to sell their land outright for full value. During the 1930s, some nine or ten cottages at the Wonderland Club were acquired by the NPS and demolished. Leases also were offered to some long- term, full- time residents in the Park area. However, restrictions on use of natural resources, particularly wildlife and timber, and the loss of the rural communities that made life in the mountains viable presented major obstacles for them. Despite these restrictions, some mountain families remained in the Elkmont area until the 1950s and one resident remained into the 1980s.

With the creation of the National Park, commercial development ended at Elkmont. Development of Gatlinburg progressed, although Elkmont retained some commercial activity. Park Superintendent J. Ross Eakin, in a letter to the National Park Service Director in 1934, noted that some of the lessees were subletting their cabins. The letter also stated that the Wonderland and Appalachian Clubs were entertaining paying guests and were, in effect, hotels.

The community of Elkmont was gradually removed during the 1930s and 1940s. Many of the frame buildings were dismantled for their lumber and others were moved. The Elkmont Baptist Church was moved to Wears Valley where it stands today as Valley View Church. A 1943 U.S. Geological Survey map shows only two buildings and the Elkmont School remaining on the site. The last class in the school was held that same year. A Civilian Conservation Corps (CCC) camp was established on the site in the late 1930s. The post office closed in 1950. In 1952, the National Park Service established a campground on the site of the former Elkmont community and the CCC camp, which eliminated almost all of the remaining above ground evidence of both the town and the camp. However, the road system, which followed the same alignment of the Little River Railroad that historically tied the town and the Wonderland and Appalachian Clubs together, remains in use today.

Creation of the National Park resulted in preservation at Elkmont, albeit inadvertently, of a fragment of the architecture that was typical of the recreational use of the mountains in the four decades prior to the Park's dedication in 1940. Restrictions on further commercial development, transfer of

property, and new construction after 1932 have preserved much of the original character of the two club communities at Elkmont. While the majority of the buildings that made up the Appalachian Club and the Wonderland Club in 1940 still remain, above- ground physical evidence of the railroad (except for the road system), the timber industry, and the town of Elkmont has disappeared. Although these above- ground features of the Town of Elkmont no longer exist, below- ground archaeological evidence may still remain. Thus far, few archeological investigations have been conducted in the Elkmont Campground, but of those that have been conducted, little to no evidence has been recovered.

Current Condition of Buildings

The following description of existing structural conditions of extant resources that comprise the District is taken from the baseline report and recent structural reassessments. The initial structural assessment, undertaken as part of the NEPA and Section 106 compliance processes, was conducted as part of the baseline work conducted in 2002, and was updated in the fall of 2003. An overview of this information was presented to the general public at meetings held in March 2004, and to the Consulting Parties the following month. The condition of the buildings is described by area starting with the Wonderland Club, including the Wonderland Hotel and the Annex, and followed by the condition of cabins and other buildings in the Wonderland Club, and then the Appalachian Club. It should be noted that the terms "good", "fair" and "poor" as defined in the 2003 reassessment of buildings are relative assessments of their physical condition.

"Good" indicates that a building component or system needs no more than cleaning or a minimal amount of repair or replacement of existing components. Those buildings rated in good condition need items such as roof repair; replacement of lattice skirting around the crawl space; repair of stone walls under porches; and removal of debris from the interior.

"Fair" indicates that a building or component can be brought back to good condition with a moderate amount of repair or replacement of the existing components. Those in fair condition require more extensive work as compared to those in good condition, including repair of water damage requiring either roof replacement or considerable repairs; repair of water damage to ceiling and floors; repair or replacement of porches; replacement of some foundation posts or other foundation repair; repair of siding boards; and replacement of missing window sashes.

"Poor" indicates that a building component or system requires extensive repair or replacement. Those in poor condition have most of the same types of problems as those in fair condition, but the problems are more extensive. For example, a floor system in poor condition might require framing replacement, considerable structural reinforcement might be necessary to correct excessive sagging, or the flooring and framing might be significantly damaged and require total replacement in one or more rooms.

If any of the buildings are proposed for reuse and are to be occupied for overnight stays, electrical and plumbing systems will have to be brought up to code, sprinkler systems for fire suppression will have to be added, and accessibility will have to be addressed. Any proposed modifications would have to be completed following guidance provided in *The*

Secretary's Treatment Standards (NPS 1995, Revised 2001). These factors are all accounted for in Appendix C, which provides a breakdown of the anticipated costs associated with the recommended treatment of each building for each proposed alternative.

Wonderland Club

The Wonderland Club is composed of the Wonderland Hotel and Annex buildings, and ten cabins. Six of the cabins are considered contributing to the District, as are the hotel and Annex.

Wonderland Hotel

This two- story frame building was built in three stages. The front section facing Little River Road was constructed in 1912, an extension to the east wing was constructed ca. 1928. Additional details of its construction are described in the baseline cultural resources report (Cleveland et al. 2002). This baseline document was amended by an addendum prepared in 2003, which updated the baseline report's condition assessment of the hotel (Cleveland 2003). Other reassessment information is also available on the web site.

Despite stabilization measures undertaken by the Park pursuant to a plan developed by the NPS Historic Preservation Training Center, the hotel cannot be restored due to its current condition. The hotel collapsed in August 2005 due to advanced deterioration and the failed structural system. As a result, the only option available for the Wonderland Hotel would be reconstruction.

Wonderland Hotel Annex

The Annex was built in 1920 to provide additional guest accommodations and a social area. While it was classified as being in good to fair condition overall in 2002, the Annex contained areas of spot deterioration that were allowing water to penetrate the building. These entry points had likely been in place for some time, but the damage they were causing was obscured during previous visits by ceiling and wall coverings. The true condition of the building became evident during the 2003 reevaluation when significant water damage from a leaking roof at two rear inside corners was discovered. Damage was also noted around the social room fireplace where the roof flashing at the chimney had failed.

Originally, there were two porches on either side of the social room. One porch was open and the other was screened. The open porch, located on the side of the building facing the Hotel, had collapsed prior to the initial assessment in 2002.

Other Wonderland Club Buildings

Ten cabins remain standing in the Wonderland Club, six of which are considered contributing resources. Four noncontributing cabins and a woodshed comprise the remaining buildings in the Wonderland Club. These buildings are noncontributing because they have had alterations and modifications that are not in character with the period of significance, and/or have lost their structural integrity. The condition of all cabins in the Wonderland Club is provided in Table 3- 2.

Appalachian Club

As noted previously, the Appalachian Club is composed of the Appalachian Clubhouse and the areas of Daisy Town, Society Hill, and Millionaire's Row. Each of these elements is discussed below.

Appalachian Clubhouse

The Appalachian Clubhouse served more as a social center for the cabin residents than as a tourist destination, as was the Wonderland Hotel. The original building burned in 1933, was reconstructed in 1934, and is considered to be in comparably good condition. Designed by Knoxville architect Alfred Baumann, Jr., it has a large porch on the front with cobblestone chimneys and fireplaces at each end of the large social room.

The Appalachian Clubhouse has been stabilized by the Park pursuant to an October 1998 NPS Historic Preservation Training Center assessment and recommendations (McGrath 1998). The Park cleared out trash and debris, secured the doors and windows, installed window vents/ louvers, installed brick and stone caps on the two chimneys, and installed several support posts beneath the main floor. If the Appalachian Clubhouse were to be utilized as a day use facility, it would require restoration of the porch, refinishing of its interior finishes and creation of ADA accessible entrances, as well as ADA compliant restroom facilities. The crawlspace lattice work also requires repair and wallboards and windows in the basement rooms below the Clubhouse show signs of extensive rotting. Also, the steps to the building must be replaced. The sagging porch floor should be jacked up and reinforced, and the footings and foundation posts may require repair or replacement.

A condition reassessment of the Appalachian Clubhouse was conducted in the fall of 2003. This reassessment noted evidence of minor water damage from roof leaks, settling of the floor in places, and rot or deterioration of building components such as foundation posts, window sashes, window screens and siding. The existing fixtures are outdated or unusable. Most other building components assessed were determined to be in relatively stable condition. Overall, the condition of the building appeared similar to that observed in 2002.

Daisy Town Buildings

Daisy Town is the area adjacent to and south of the Appalachian Clubhouse that lies between the Clubhouse and the road to Jakes Creek cemetery. There are 20 buildings still standing in Daisy Town and 15 of these are considered contributing. The noncontributing buildings in Daisy Town (using the names as they appear on the National Register of Historic Places) are Swan (#4) built in ca. 1910; and four buildings rebuilt in 1974 after a fire destroyed the original cabins [Sneed (#12), Jamerson (#14), Burdette (#16), and Bagley (#17)]. The Swan cabin had major alterations and the four 1974 cabins are modern, non- historic buildings. The Swan cabin would require exterior restoration in order to be considered contributing if it is retained under any of the proposed alternatives. An additional building (Gaylon [#9]) has an associated noncontributing rear room which also would be removed if this building is retained.

Society Hill Buildings
Lying south (upstream on Jakes Creek) of Daisy Town, most of the cabins in Society Hill are located between Jakes Creek Road and Jakes Creek. Of the 25 cabins in this portion of the Appalachian Club, 16 are considered contributing.

All of the noncontributing buildings have major conspicuous alterations or partial or complete loss of structural integrity. The more extensive repairs required are noted in Table 3- 2, and these are dependent upon the potential reuse as described in each alternative.

Millionaire's Row Buildings
This area was the last to be constructed and consists primarily of larger buildings. There are eight remaining cabins, six of which are contributing to the District. The two noncontributing buildings (as listed on the National Register of Historic Places) are the Parrott cabin (#44) built ca. 1928 and the Young cabin (#48) built ca. 1930. Both of these display major conspicuous alterations.

Cabins and other remaining buildings such as garages were assessed throughout all areas of the District. The condition of these buildings is provided in Table 3- 2. Common repairs or treatments required include roof repair or replacement; repair of water damage; installation of porch and floor supports as well as foundation repair; and exterior restoration. Depending on the proposed use, repair and rehabilitation of the interior and upgrading of the plumbing and electrical systems may also be necessary.

Some trees that could fall on buildings in the District may require removal. Mowing, trimming vegetation, and pruning are routinely performed by the Park across landscapes surrounding historic buildings. A Servicewide Programmatic Agreement between the NPS and the Advisory Council on Historic Preservation (ACHP 1995) contains provisions for the Park to manage historic resources while providing for visitor safety. The landscapes surrounding the historic buildings at Elkmont are subject to the same management practices implemented in other areas of the Park and the management prescription for such landscapes in the District is guided by assessing risks to public health, historic resources, and property on a recurring basis (recognizing landscapes as dynamic systems). The scale of hazardous tree removal and vegetation management required in the District will be determined by the number of buildings to remain, intended use and the condition of the landscape at any given time. Environmental consequences of vegetation management are discussed further in Chapter 4 for each project alternative.

Table 3- 2: 2003 Condition of Cabins and Other Buildings

Building*	2003 Condition	Comments
Appalachian Club – Daisy Town		
Appalachian Clubhouse	Good	Built ca. 1934. Roof and flashing between roof and chimney needs repair, minor water damage from roof leaks, settling of the floor, rot or deterioration of lattice skirting around crawlspace, foundation posts, wallboards, main staircase, porch floor, railings and support posts, window washes, window screens and siding.
Sneed (1) (C)	Good	Built ca. 1910. This log building was stabilized in 1999 and again in 2004. As of 2003, the building was still in good condition.
Smith (2) (C)	Fair	Built ca. 1910. The 2003 reassessment found the exterior remaining in fair condition.
Higdon (3) (C)	Poor	Built ca. 1910. The 2003 reassessment revealed damage evident at the south side roof valley where the rear wing and main section meet. The rear chimney bricks are failing and the rear wing is leaning and rotting in places.
Swan (4) (NC)	Fair to Poor	Built ca. 1910. Front porch flooring rotted; water damage at ceiling; main room floor sloped; north central room has water damaged ceiling; rear hallway floor slopes; kitchen ceiling failing due to water penetration; enclosed rear porch has a major roof leak; addition has water penetration through hole in roof, causing some of ceiling to collapse and most of floor to collapse; wood steps on north side are gone, landing floorboards soft; north end roof valley has lost metal and asphalt covering; some rear siding is split and/or rotted.
Addicks (5) (C)	Fair to Poor	Built ca. 1910, a "set off" house. The 2003 reassessment revealed that the front porch was in fair to poor condition and was stabilized in 2004.
"Adamless Eden" (5A) (C)	Fair to Poor	A playhouse built ca. 1921 of unhewn logs. The 2003 reassessment found conditions somewhat fair to poor and the playhouse was repaired and stabilized in 2004.
Creekmore (6) (C)	Fair to Poor	Built ca. 1910. The condition was fair to poor and by 2004, the rear, modern deck had failed.
Mayo (7) (C)	Good	Built ca. 1910, a "set off" house. The 2003 reassessment indicated that the building was still in good condition.
Levi Trentham Log (7A) (C)	Good	Built ca. 1830 and moved to the lot in 1932. This building was in good condition in 2002 and the overall appearance in 2003 was similar.
Mayo Servants' Qtrs. (7B) (C)	Good to Fair	Built ca. 1920. The 2003 reassessment indicated that the building was I good to fair condition. This building was cleaned and stabilized in 2004.
Cain (8) (C)	Fair	Built ca. 1915. The 2003 reassessment indicated that the building was in fair condition.
Galyon (9) (C)	Poor	Built ca. 1910; one room addition is noncontributing and is no longer connected to the main building. The 2003 reassessment revealed exterior conditions had worsened. Some front porch foundation posts are rotted; middle addition on north side sags due to a fallen foundation post; eave damage at the rear additions on north side; gutter has fallen off rear addition on the south side; rear siding shows moisture damage; rear sill of main block is rotted in places; and bottom edge of siding is rotted on the south side and on the southwest corner.

*(C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club – Daisy Town (continued)		
Galyon rear 1- rm. (NC)	Good to Fair	Exterior at entry has rotted area and missing fabric. The siding displays rot and water damage.
Baumann (10) (C)	Fair	Built ca. 1910; some front porch foundation posts are rotted; middle addition on north side sags due to a fallen foundation post; eave damage on rear addition (north side); gutter has fallen off rear addition (south side); rear siding shows moisture damage; rear sill of the main block is rotted in places; and bottom edge of siding is rotted at south side and southwest corner.
Scruggs- Brisco (11) (C)	Poor	Built ca. 1915, fair to poor condition at rear. The 2003 reassessment revealed stones missing from the front porch foundation; rising dampness visible on south side; deterioration of the roof on the south side entry porch; sagging of the southeast corner of cabin; rotting of the siding at the southeast corner; and the north side entry steps are rotted/missing.
Sneed (12) (NC)	Poor	Rebuilt in 1974 after a fire destroyed the original building. Building sinking at middle; water damage in downstairs bathroom and possible bat infestation noted in several places on second floor; exterior plywood siding is warped at bottom on north side; rear porch steps and rails are rotted/missing; and dry rot evident exists at rear porch sill.
Cook (13) (C)	Fair to Poor	Built ca. 1912; the 2003 assessment revealed that the exterior has these problems: the front porch displays rot in floorboards and at the railing; the siding is rotted on the south side, especially in the area of the meter box; portions of the foundation lattice are rotted on the north side; some perimeter foundation posts are rotted; and foundation piers of the rear additions are leaning.
Jamerson (14) (NC)	Good	Rebuilt in 1974 after a fire destroyed the original building. Exterior rear deck sags; piece of rear deck railing is broken; and concrete block pier supporting northwest corner addition is leaning.
Hale (15) (C)	Poor	Built ca.1914; the 2003 reassessment revealed these problems with the exterior: a rusted gutter at the entry steps; the front porch sags; boards covering the foundation at the southeast corner and east side are rotted; the roof is damaged at the rear high section, possibly from limbs falling off a dead tree; the roof is damaged at the northeast corner of the room; the roof, eaves, and siding are damaged in the middle of the north side of the building.
Burdette (16) (NC)	Fair	Rebuilt in 1974 after a fire destroyed the original building. Building has water damage throughout. The exterior has mildew and mold on creek side; water damage at south side; gutter above southeast corner shed rusted and roof of shed caved in; north side steps rotted and fallen; and west side windows are broken.
Bagley (17) (NC)	Fair	Rebuilt in 1974 after a fire destroyed the original building. Building displays moisture damage and mold; and uneven/buckled linoleum floor. The exterior has broken windows on south side; rising damp at sump room addition; and broken sliding glass doors at rear.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Society Hill		
Gilliand (18) (C)	Fair to Poor	Built ca. 1916. The 2003 reassessment revealed these exterior issues: rotting siding on the east side of the south side addition; rotting of the second- story window hood on the south side of the main block; a rusted gutter at the entry; a sag in the front room of the first story; and the rear steps are soft and rotting.
Thomas (19) (C)	Poor	Built ca. 1910. Structural defects noted in 2003 include: front porch floor sags and is rotted in places; foundation lattice on east side is rotted; north end porch room sags and leans; foundation lattice bows at the north side; mid- rear room on north side leans to east; mildew on support timbers near the creek; sill and siding at southwest corner of rear wing are damaged; rear foundation lattice is broken; south chimney is cracked and adjacent floor sags.
F. Andrews (20) (NC)	Fair	Built in ca. 1910. Southeast room (addition) floor slopes to south; southwest kitchen has water damage at ceiling, floor, and walls; the west center room has water stains at ceiling and floors that slope south; the northeast room has uneven floor and the stone chimney leans to west; northwest room floor slopes to east; basement bathroom has mold and mildew; and basement southwest area wood floor rotted at entry. Exterior has rotted sill at entry to hot water heater room on south side, rotted siding at rear basement room, soft eaves at first- story rear, mildew at front timbers and needs extensive porch repairs.
Andrews- Sherling (21) (C)	Poor	Built ca. 1912. Structural defects and exterior condition issues noted in 2003 included: recent graffiti is inscribed in the concrete next to the west chimney; rotted sill at the entry to the hot water heater room on the south side; rotted siding on the rear basement room; eaves at the rear of the first- story are soft; and there is mildew on the front support timbers.
Congleton- Brownlow (22) (C)	Poor	Built ca. 1915. The 2003 reassessment found these exterior issues: rotted fascia at south side; moss growing on the roof; rotted front porch roof and damaged siding at each end of porch; porch roof truss sags; fascia is missing at the north side; siding is rotted at the northwest corner; and the overhanging eave at the rear screened porch has rotted and is collapsing.
McDonald (23) (C)	Poor	Built ca. 1910. In 2003, structural issues with the following exterior conditions were noted: the roof of the second- story room sags; the steps to the second- story room are rotted and missing; the bottom edge of the siding is rotted on the south and east sides; and the crawl space door on the north side is rotted.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Society Hill (continued)		
W. Arnett (24) (NC)	Fair	Build in ca. 1912. East inset porch has floor rotted and water- damaged ceiling; main room buckling floorboards, water damage at chimney; windows broken in front bow window; hallway to rear floor buckled and slopes to north; north center room floor buckled; bathroom floor uneven; northwest room floor slopes to rear and has mildew; rear screened porch floor slopes and has hole in floor at door to rear deck; south room fireplace leans and crumbling; water damage at chimney and adjacent wall surfaces; floor and walls slope away from chimney on each side and floor is buckled; rear bathroom floor slopes toward creek; and rear pantry and kitchen have extensive water damage at ceiling, walls, and floor, and floor slopes toward creek. Exterior stone foundation wall at rear has numerous cracks and is missing stones; bottom of siding rotted at west and north sides; rotted steps and landing at rear; eave damage at northwest and northeast corners; and some perimeter foundation posts rotted at north side.
Franklin (25) (NC)	Fair	Build in ca. 1913. Front porch north section has rotted railing, east section has rotted railing and floor is rotted near railing, and there is ceiling and floor damage at entry; rear porch room has water- damaged to the ceiling, walls, and floor in southeast corner; and the front fireplace room has water stains at chimney. Floors slope in the main, rear porch, southwest, and fireplace room. The exterior basement-level landing on north side is soft, bottom edge of siding at northwest corner room is deteriorated, rear deck is soft, moss on roof, roof deteriorated at chimney, and siding in front gable is rotted.
Hutchins (26) (NC)	Fair	Build in ca. 1912. The front porch has some rotted rafter ends, water stains at ceiling, and rotted siding at north end; main room ceiling and beams sagging, and water stains at ceiling; rear dining room floor slopes to rear; northwest room floor uneven; northeast room floor uneven and hole in ceiling, water damage to ceiling, floor and east wall; and the basement storage room has a collapsed wood floor. The exterior has soft rear steps, moss, mildew, and rising damp evident on rear siding, and the chimney has vertical cracks and is leaning away from building.
Gaines (27) (NC)	Fair to Poor	Build in ca. 1912. Front porch floor rotted at front edge; main room has hole in ceiling at chimney, uneven floor, and water stains at ceiling; southeast bathroom/washroom floor slopes to front, and there is mildew and water stains at ceiling and walls; south- southeast room floor uneven; south- southwest room and bedroom have uneven floor and some water damage at ceiling and floor; rear porch south section floor has rot and slopes toward cabin, and the north section floor has rot, large holes, and slopes toward cabin; northwest room floor sloped and has water stains; northeast room floor slopes to the middle; and northwest corner porch at basement level floor rotted and sloped toward cabin, and rear wall is pulling away from ceiling. The exterior chimney missing stones at rounded cap; rear north wall bows out; rear porch sill rotted; rear porch posts rotted at bottoms; some rear siding rotted; and there is termite damage.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Society Hill (continued)		
Spengler- Schmid (28) (NC)	Fair	Build in ca. 1912. Front porch south end displays rot; main room floor slopes to rear, moisture damage; leak at chimney and adjacent wall damage; adjacent bathroom floor sloped; northwest room floor sloped; interior room has uneven floor; rear screened porch slopes toward creek at south end; kitchen has water damage at ceiling; storage room roof, ceiling, and floor damaged by water infiltration; the addition has water damage to ceiling and walls and the adjacent bathroom badly water- damaged. The exterior has rot and damage at south side of addition, window sills on addition rotted, chimney has lost mortar, gutter rusted at front porch entry, cracks and holes in front porch foundation, damaged foundation lattice at north and west sides, and eave damage at southwest corner and west side.
F. Arnett (29) (C)	Poor	Built ca. 1910. The 2003 reassessment revealed these issues in regard to the exterior: rotted logs at southwest corner, gutter rusted through; warped wooden shakes at the southwest and northwest corners; leaking gutter at the northwest corner has caused deterioration of siding, window frame, and sheathing; warped shingles in the main gables; a roof gap at the chimney and damage to the eave and siding; and the log ends on the bathroom addition are rotted.
Wright (30) (C)	Poor	Built ca. 1921. The exterior per the 2003 reassessment noted these issues: eave damage at the ridge on the north side; gap in the roofing at the chimney (north side); water- damaged siding on the north side; damaged rear porch; fascia damage at the rear of the main block; and the shed on the rear of the cabin sags.
Matthews (31) (C)	Poor	Built ca. 1910 as a log building. The reassessment in 2003 revealed the following problems: front porch rails have rotted, two south end posts are rotted at the bases, and two floorboards have buckled in the side screened porch; south main room wood floor slopes away from the chimney on each side, the chimney leans toward the rear, and walls are built from logs; kitchen floor slopes to rear, and there is water damage at ceiling along north side and in northwest corner; north room has some water damage at ceiling; and the south room has some water damage at ceiling. The exterior has holes in front porch stone foundation wall, roof gap at chimney, cracks in stone foundation at southwest and northwest corners and along west side, rear walled space has rotted siding and stone doorway/flat arch about to fail, and foundation lattice at north side rotted.
"Little Cottage" (31A) (C)	Fair	Built ca. 1925. The 2003 reassessment revealed some rot in handrails on the front entry stoop/porch and the steps are soft; the main room floor slopes in the southeast corner and has a small hole; and the rear screened porch floor slopes to the east and the wood screen door has fallen on floor.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Society Hill (continued)		
Allen (32) (C)	Poor	Built ca. 1910. In 2003, exterior was found to have these issues: eave and gutter damage west of the chimney on the north side; rotted and missing boards at the basement storage room on the north side; the gutter is off at the south side porch; and the south side porch leans.
Jeffords (33) (NC)	Fair	Build in ca. 1920. Main room floor slopes away from chimney and slopes to south- southeast overall; adjacent north end space floor slopes to north and to stove platform at center; northwest room floor rotted, wallboard walls and ceiling heavily water- damaged; kitchen floor, bedroom off kitchen, bathroom, southeast room floor slope; water- damage to ceiling; exterior has rot at bottom edge of siding on east side, roof sags at ridge, north side shed addition sags at sill, split siding at north side of rear addition, siding of southwest corner room displays rot, foundation posts of southwest corner room rotted and leaning, south side siding is split and rotted, and sill on south side sags.
McAmis (34) (C)	Fair to Poor	Built ca. 1920. The 2003 reassessment noted exterior issues as follows: rotted fascia above the porch roof; rising dampness evident on the front siding; north side eave is rotted on both sides of the chimney; rotted support posts, eaves, and siding at the basement room.
Culver (35) (C)	Fair to Poor	Built ca. 1922. The 2003 reassessment noted that the exterior exhibited these problems: rot at the bottom edge of the front siding; missing and rotted siding at the north side; eave damage at the rear; rear siding is rotted and missing where the deck and steps have collapsed.
Knaffl (36) (C)	Failed 2005	Built ca. 1922. In 2003, the following exterior issues were revealed: the metal roofing is off or coming off; stones at top of chimney are missing; the ridge/eaves are split at south side; the siding is coming off at the southeast corner; the bottom edge of the siding is rotted along the rear side; the basement wall is bowing in on the north side; and the wood shingles on the front and northeast corner are warped.
Johnston (37) (NC)	Fair	Build in ca. 1920. Main room floor slopes off center to each side, and hole in ceiling at chimney; screened porch and deck have hole in roof/ceiling near wood screen door to outside and at southeast corner; hall to north bedroom floor slopes to north; and north bedroom floor sloped and uneven and there are water stains at ceiling. The exterior bottom edges of siding shows rot; screened porch sags, and sill rotted on east side of chimney.
Byers (or Chapman) (38) (C)	Poor	Built ca. 1912. The 2003 condition assessment noted the following exterior issues: the siding is cracked in several places; several foundation slats are missing; the sill at north side of the sleeping porch is rotted; fascia is rotted at the northeast corner; and there is water damage and missing support posts at the southwest corner. This building was stabilized in 2004.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Society Hill (continued)		
Dudley (39) (C)	Fair to Poor	Built ca. 1923. The reassessment in 2003 revealed that the chimney is in need of repair as well as the following problems with the condition of the exterior: the front gutter and fascia is pulling away from the porch roof; several porch foundation slats are rotted; there is mildew/mold at the rear north side, the west side, and the rear south side; the wood steps to the rear deck are rotted.
Kuhlman (40) (C)	Fair	Built ca. 1925. The reassessment in 2003 noted the following problems with the exterior: gutter is rusted and the eave is rotted at the northeast corner, at the north side of front porch, and at the front porch entry (south side); the entry porch stair rail is soft; the fascia board is rotted at the rear of the south side; and the gutter is partially rusted at the east side.
Kuhlman garage (40A) (C)	Good to Fair	Built ca. 1926. The 2003 assessment revealed that the gutters were the primary problem on the exterior.
Kuhlman woodshed (C)	Fair to Poor	Built ca. 1926. The 2003 assessment indicated that the asphalt roofing had deteriorated and was missing and there is a sag in the roof.
McNabb (41) (NC)	Fair	Build in ca. 1923. Main room floor slopes away from chimney on each side and section of fallen ceiling exist; kitchen floor slopes to east; bathroom floor slopes to east; south middle room floor slopes to south slightly; and southwest room has water damage at south wall and ceiling below skylights. The exterior siding is missing at northeast corner, rusted gutter at south side, and eave damage and rot at southeast corner.
McNabb privy (NC)	Fair	Build in ca. 1923. In 2003, the bottom edge of the privy siding was rotted where it touches ground.
Appalachian Club - Millionaire's Row		
Spence (42) (C)	Fair	Built ca. 1928. The 2003 reassessment found these exterior items that require attention: the west end wing (south side) has cracked and loose foundation stones; the crawlspace opening leans to the east, and the sill has a noticeable sag; the west gable end is damaged at the ridge (possibly from fallen tree); the log over the main entry has rot; the rear patio has stones missing and displaced; the wood steps at the small rear screened stoop/porch lean away from cabin; the siding, lattice, and door of the basement rooms have extensive rot.
Brandau (43) (C)	Fair to Poor	Built ca. 1928.The 2003 reassessment revealed structural damage and the exterior condition was described as follows: one front window hood is rotted, and the other front window hood is rotted and has fallen; siding at the east side of the chimney is rotted; the roof damage at the southeast corner; moss is growing on the roof; and the roof framing is damaged at the northwest corner of the rear porch.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Millionaire's Row (continued)		
Parrott (44) (NC)	Poor	Built ca. 1928. Southeast corner porch/stoop some soft floorboards and support post rotted at bottom; main room roof leaks resulting in damaged flooring at those locations; chimney leaning to east and is sinking; loft floor slopes off center, and there is damage to the roof and floor at west wall; east room addition has damaged ceiling at east wall and northeast corner (flooring rotted, too); west room has leaking ceiling and resulting floor damage at southeast corner; west room bathroom has holes and partially collapsed/rotted areas in ceiling and floor; small room off kitchen floor slopes to north; kitchen rear space floor slopes off center on both sides; exterior roof is sagging and roofing rotted at front corner porch and room addition, rot and mildew at north side of room addition, extensive rot and damage at west bathroom addition, roof and eave damage at southwest corner and window east of chimney slanted.
Murphy (45) (C)	Fair to Poor	Built ca. 1928. In 2003, structural damage was noted regarding the following exterior conditions: clerestory is sagging near the chimney; a recent roof patch sags at the eaves; the wall below the roof patch is rotted; the foundation and wall bow out at the northeast corner; the siding is rotted at the northeast entry; the northeast window hood shows rot and is pulling away from wall; some eave damage is apparent at the north side; northwest corner has some water damage; the west wall bows out; and there is mildew on south side.
Murphy garage (45A) (NC)	Failed	The 2003 reassessment noted that the front garage roof has collapsed and the vertical board siding is removed in several places. The rear garage room (likely servant's room) has floor and ceiling water damage.
Murphy gazebo (NC)	Fair	The Murphy gazebo is a noncontributing outbuilding since it was rebuilt from the original design or has loss of structural integrity.
Miller (46) (C)	Fair to Poor	Built ca. 1928, was originally built as a cantilever barn and remodeled in 1950 as a cabin. In 2003, structural damage was noted as well as these exterior conditions: mildewed siding and some missing siding at the west end; balcony front gates are not attached; south side cantilevered second floor sags; south side foundation blocks are washed out at ground; some siding is warped on south side second floor; roof cupola has deteriorated; some roof sag is apparent at the ridge; ground- level south end railing is warped and support post is slanted at east end of the cabin; main fascia of the east end is infested with carpenter bees; second floor porch sags at northeast corner; second floor siding at the north side of the cabin has rot and water damage; several stones have fallen out of the stone walls.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Appalachian Club - Millionaire's Row (continued)		
Faust (47) (C)	Fair- Poor	Built ca. 1928. The 2003 reassessment noted structural damage with the following exterior conditions: fallen stones at the yard wall; rotted sill, siding, and framing at the rear screened porch entry (east side); rot at the rear screened porch sill on the south side; rotted siding on the rear room/bathroom on the east side; damaged eaves at the rear room/bathroom and at the west side of the main roof; rotted and missing siding and missing foundation stones on the west side of the main block; rotted eave on the north side where the main roof joins the east porch roof; and rotted and split siding at the base of the north side.
Faust garage (C)	Poor	Built ca. 1928. The 2003 assessment found that the garage is not salvageable in its current condition and would require reconstruction if it was proposed to be retained in an alternative.
Young (48) (NC)	Poor	Built ca. 1930. The front deck has soft floorboards, water- damaged railing, and rot at wood screen door and threshold leading to screened porch; screened porch floor rotted near entry screen door; main room floor slopes to northwest; rear wing den floor sinks off joists, floor low near rear chimney, and there is mildew at ceiling; rear wing kitchen floor slopes to north; and the bedroom addition floor slopes to rear and has mildew and water stains at ceiling. The exterior stone steps at deck are cracked, stone foundation at west wall of main block bowing out, roof and wall rotted at hyphen, gutter off and roofing coming up at screened porch; rear part of screened porch on east side slopes and water- damaged siding at east side of rear wing.
Cambier (49) (C)	Fair to Poor	Built ca. 1940. The last cabin constructed at Elkmont. The 2003 reassessment noted that the exterior has the following issues: the gutter, which is off at the front, requires repairs and the fascia boards are rotted as a result of water damage originating from the detached gutter; the west wall bows slightly; the rear steps and landing are rotted; and there is rising dampness on the east porch/room.
Wonderland Club		
Wonderland Hotel	Failed	Front section built in 1912. east side extension added at unknown date, rear wing constructed ca. 1928. The 2003 assessment noted the following problems: both ends of front porch have collapsed, the dormer over the front entrance has collapsed, extensive damage has occurred where the two sections of the "L" shaped building meet; post bases of many of the footings are rotting; many sections of the sill beams need replacement; the main stair has extensive damage; the roof and many elements of the floor structure are sagging; the roof has deteriorated and the gutters need to be replaced; and Gypsum and composition wallboard need to be replaced.
Wonderland Hotel Annex	Fair to Good	Built ca 1920. The following problems were noted during the 2003 assessment: spot deterioration has allowed water to penetrate the building, water damage has occurred at the two rear inside corners and to the social room fireplace where the roof flashing at the chimney has failed; the open porch has collapsed.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Wonderland Club (continued)		
Wonderland Servants' Quarters (Riordan) (58) (C)	Poor	Built ca. 1930. The 2003 reassessment revealed rising exterior dampness; west entry and portico on south side are leaning east; crack in concrete walk/stoop at the east entryway on the south side; insect damage has occurred to some foundation posts; a portion of the cabin south of the chimney is leaning south/southeast; the eaves are soft at several locations; and the siding at the west side entry portico has sustained water damage.
May or Moore (58- 1A) (C)	Poor	Built ca. 1917. Structural problems were evident during the 2003 reassessment. Exterior problems noted include: a missing section of eave at the front of the main roof; the east end of the front façade bows outward; a section of the eave at the west side of the chimney is rotted; a hole has developed in the siding at the chimney; and the steps and deck to the northeast corner entryway are rotted.
Paine (58- 2B) (C)	Poor	Built ca. 1928. Structural problems were evident during the 2003 reassessment. Exterior problems noted include: siding is rotted at the bottom edge; a falling tree apparently ripped the gutter off of the north side of the addition; the gutter at the south side of the addition has fallen off; the siding in the east gable of the main block shows rot and mildew; the west side of the main block is mildewed; and the wooden steps and landing at the rear screened porch are rotted and have collapsed.
Preston (58- 3C) (C)	Fair	Built ca. 1922. The 2003 reassessment revealed the following exterior problems: the shingles at ground level are rotted and mildewed; the higher shingles are warped and brittle, with some missing; the roof is covered with plant debris and vegetation is growing on it.
Bowman or Brown (58- 4D) (NC)	Poor	Built in ca. 1913. Multiple holes in roof resulting in damage to ceiling walls and floor in dining room, southeast room off dining room, kitchen, hallway off kitchen, east and west bathrooms, interior chimney room, and vestibule. Enclosed dogtrot/hallway to rear screened porch has holes in wallboard ceiling and the wood floor sloped; interior room (contains rear side of later stone chimney) wallboard ceiling falling and wood floor rotted at south side; west end den wallboard ceiling falling, rotted wood flooring and water damage all around, especially at edges; rear screened porch has two holes in roof/ceiling at east half; and one hole in roof/ceiling at west end of west half (resulting in rotted siding and flooring); sink room at bottom of stairs has water damage; rear corner porch has rotted wood railing; north side bedroom wood floor slopes to west and is rotted in places, some water damage at wallboard ceiling and moldy sheet paneling at walls; and the west end bedroom has water- damaged wallboard ceiling and wood floor and moldy sheet paneling at walls. Exterior shingles and plywood are saturated with water; some shingles warped and brittle, large tree limb on roof, roof sags at ridge, toward chimney, and to rear, soft eaves, collapsed roof at front entry stoop, stoop materials rotted and soft, rear porch roof partially gone at west end, middle rear porch roof collapsed, vertical boards at foundation rotted and perimeter foundation posts rotted, split, or leaning.
Hicks (58- 5E) (C)	Fair	Built ca. 1918. The 2003 reassessment found evidence of the following exterior problems: eave damage has occurred on the east shed addition; there is some siding rot at ground level; and the front screened porch crawlspace door has fallen off its hinges.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

Table 3- 2: Continued

Building*	2003 Condition	Comments
Wonderland Club (continued)		
McMillan/Keith (58- 6F) (NC)	Poor	Built in ca. 1922. The 2003 reassessment revealed that the front screened porch has several holes and rotted places in deck and holes in roof/ceiling; main room has uneven floor, water stains at ceiling, and ceiling is falling in places; southeast room floor rotted and uneven, ceiling caving in and closet is damaged; kitchen roof/ceiling collapsed; 2- panel door with one light to collapsed rear porch; southwest room floor soft and slopes to north and ceiling is down in southeast corner; northwest room floor slopes to west; tree damage to roof on east side; rear porch roof and walls collapsed; former landing at rear of east side rotted away, T1- 11 siding on east side rotted in places; soft eave on west side; and southwest corner of cabin coming off concrete block supports
Vandergriff (58- 7G) (NC)	Poor	Built in ca. 1925. Structural problems revealed by the 2003 reassessment included: east side porch roof sagging; water damage on roof; concrete and stone deck cracked; south end of wood deck rotted; main room floor and wall lean east at chimney; north end addition leans west; ceiling is water- stained near chimney; and rear bedroom floor slopes off center on both sides. Exterior siding panels mildewed; tree lying on main roof; southwest corner ramp and landing leaning slightly; and south end window and frame bowing out and wall warped.
Tate, Beaman & Tucker (58- 8H) (C)	Fair to Poor	Built ca. 1926. Structural problems were evident during the 2003 reassessment as well as exterior issues: stone retaining wall at the road is cracking and spalling; foundation siding is rotted at northeast corner; gutter is down on east side near front; siding is rotted at ground on east and west sides near rear; holes in the roof/eave at northwest and southwest corners; and vertical boards at south side of the foundation are missing or rotted.
Richards or Brandau (58- 9I) (NC)	Poor	Built in ca. 1920. Structural problems revealed by the 2003 reassessment included: east side porch slopes to south/southeast and the floorboards are rotted; kitchen floor slopes to southwest and there is water- damaged ceiling and floor at southeast corner; rear screened porch has water damage at southwest corner; floor at east end slopes north; hole in roof/ceiling and falling wallboard; west closet and bathroom addition pulling away from cabin; main room chimney leans to north; hole in roof/ceiling at north end and hole in floor below; northeast bedroom room leans to south/southeast; water- damage to ceiling; east middle bedroom room leans to south and floor slopes off center on both sides; east room in basement has missing or rotted floorboards and some support posts leaning; west room of basement has fallen portions of wallboard ceiling; exterior roof near south end was crushed by large tree limb; siding rotted at ground on east side near rear; tree lying on concrete deck of north end porch, northwest eave, corner of roof, and upper siding knocked off by tree, gutters off and eaves soft at west side, roof and eave damage and rotted siding at southwest corner.
Richards or Brandau woodshed (NC)	Poor	Built in ca. 1940. In 2003, the reassessment revealed that the roof had failed and the siding was missing or lying on the ground at the south side of the building.

* (C) = Contributing; (NC) = Noncontributing; (1) = Resource Number

3.1.1.2 Cultural Landscape

As part of its research, the Park is charged with inventorying its cultural resources, including buildings and structures, archeological resources and cultural landscapes. Cultural landscapes are defined in the NPS *Cultural Resource Management Guideline* as "settings we have created in the natural world" that "reveal fundamental ties between people and the land—ties based on our need to grow food, give form to our settlements, meet requirements for recreation, and find suitable places to bury our dead. Landscapes are intertwined patterns of things both natural and constructed: plants and fences, watercourses and buildings. They range from formal gardens to cattle ranches, from cemeteries and pilgrimage routes to village squares and are special places: expressions of human manipulation and adaptation of the land" (NPS 1997).

The NPS management guideline for cultural landscapes directs that a Cultural Landscape Inventory (CLI) be undertaken for the purpose of providing information on "location, historical development, character- defining features, and management" to "assist park managers in planning, programming, and recording treatment and management decisions" (NPS 1977). Great Smoky Mountain National Park began this effort for Elkmont by completing draft CLI forms and producing draft site plan drawings in 2001, which were used as part of the baseline cultural resource study (Cleveland et al. 2002). Most of these draft drawings were focused on the individual buildings and their immediate surroundings.

The cultural resources baseline work and report included information on the cultural landscapes around each building, as well as those District- wide cultural landscape elements and features that were considered contributing to the District (Cleveland et al. 2002). Additional work on the history of the development of the cultural landscape at Elkmont was undertaken and is included as Appendix B. The focus of this additional work was to develop a historical chronology of the cultural landscape development at Elkmont immediately before, during and shortly after the period of significance, as listed in the National Register (1908- 1940), in order to determine if it was appropriate to classify Elkmont's cultural landscape into management zones as part of the EIS process. As part of this study, plan maps from five identified historic periods were developed:

- Pre- National Register of Historic Places (NRHP) Listed Period of Significance: 1880s–1907
- NRHP Listed Period of Significance 1908–1940: Sub- period 1908–1913
- NRHP Listed Period of Significance 1908–1940: Sub- period 1914–1924
- NRHP Listed Period of Significance 1908–1940: Sub- period 1925–1932
- NRHP Listed Period of Significance 1908–1940: Sub- period 1933–1942

Emphasis was placed on how Euro- American settlement and occupation patterns affected land use, spatial organization and use of the natural environment. For each historic period, historic maps, photographs, drawings and texts were reviewed that identified the topography, natural and cultural vegetation, circulation, natural systems and features, views and vistas, buildings, structures and small- scale features present in the District. Understanding the landscape over time allowed for informed analysis of what remains of the cultural landscape, as well as what does not remain or is no longer apparent. These maps are presented in the Cultural Landscape Assessment (Appendix B). Although the official period of significance for the District as defined in the National Register ends in 1940, the listed period of significance was extended to 1942 in the

Cultural Landscape Assessment. This additional period was included to capture the cultural landscape components that were installed during the final period in which the Civilian Conservation Corps was still active in the Park.

While not all characteristics and features from each period have survived, a sufficient number are still present in their original location. Because the surviving characteristics and features are located within a National Register of Historic Places- listed historic district and their integrity has been retained, they are recommended as contributing to the District. Those features directly associated with a particular building are recommended contributing to that building, as well as to the District as a whole. Larger, District- wide elements and features not directly tied to a particular building, but meet necessary criteria are also recommended as contributing to the District.

Researchers found that, in terms of cultural landscape management zones, the cultural landscape characteristics and features are evenly distributed throughout the District to the point that the definition of zones would not be of management value—in essence, the District is a cultural landscape management zone in and of itself and is viewed as a whole unit for management purposes and impact assessment. Table 3- 3 provides representative examples, by type of feature, of the remaining significant cultural landscape elements within the District.

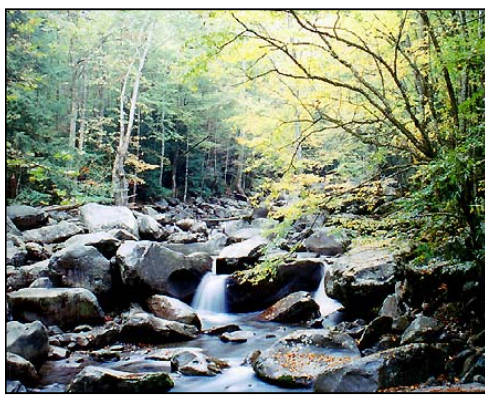
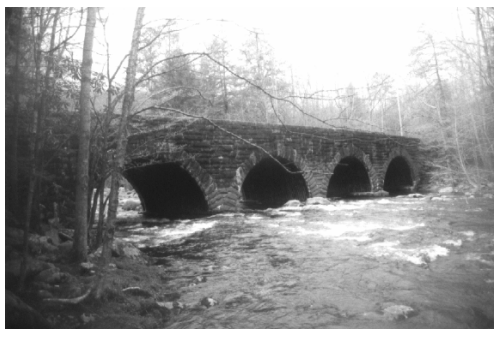
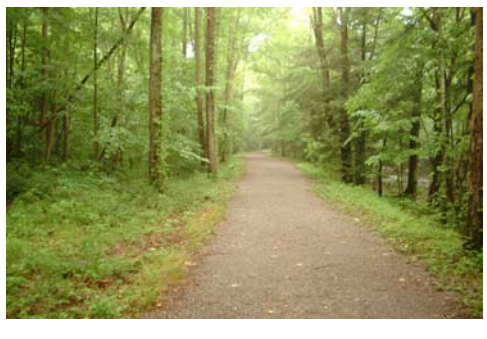
3.1.2 Archeology

Archeological baseline investigations were conducted in a series of four survey level studies over a two- year time period. The studies were phased for several reasons: to gather baseline information on the archeological resources of the District in a way that builds upon the small amount of information known about the District; to explore potentially sensitive areas based on geomorphological analysis to gain knowledge on the resources potentially present; and to gather sufficient information to compare potential management alternatives in terms of the type and amount of archeological work that would be necessary to implement a selected alternative. A complete (100%) survey of the entire District has not been conducted; however, sufficient information has been gathered in order to inform the archeological impact analysis and alternative selection process. The research methodology for each examination and the scientific reports resulting from these studies were reviewed by the Park and the SHPO Tennessee Historical Commission through the Tennessee Division of Archeology under the Section 106 consultation process. All work was conducted under Archeological Resources Protection Act (ARPA) permit GRSM 02- 002.

The earliest known archeological investigations at Elkmont occurred in 1936, when George MacPherson, a Park employee who conducted archeological reconnaissance in both Tennessee and North Carolina, discovered artifacts in a field near Little River and Elkmont Road. The site was apparently revisited by Quentin Bass in the 1970s, who noted that the site produced a “pitted cobble” but provided no other information (Bass 1975).

There is no record of additional archeological investigations at Elkmont from the 1930s to the 1990s, although former residents have indicated that prehistoric sites were known to be present in at least the Appalachian Club and Society Hill areas. Further, no archeological investigations were conducted at Elkmont in association with cultural

Table 3- 3: Significant Surviving Landscape Characteristics and Features within Elkmont Historic District

Type and Description of Characteristic or Feature	Representative Photo of Examples Found in Elkmont Historic District	Type and Description of Characteristic or Feature	Representative Photo of Examples Found in Elkmont Historic District
Spatial organization Pattern of watercourses, landforms, circulation routes, topography, vegetation, nodes of development, buildings and structures, and smaller features *Photo Descriptions*: View of Little River adjacent to Elkmont Road between the Wonderland Club and the Appalachian Club		**Small- scale features** Wonderland Hotel steps, fountain, and side paths; remnants of Camp Le Conte dam and power plant; Bearwallow Branch footbridge; CCC culverts and erosion control walls; remnants of CCC walkway at swimming hole; stone fireplace or possible still between Cabins 46 & 47 *Photo Descriptions*: Remnants of stone wall in the Wonderland Club	
Natural systems and features Little River, Jakes Creek, numerous branches (including redirected Bearwallow Branch), and loss of "island" when stone arch bridge cut off branch of Little River through Elkmont Town (current campground) *Photo Description*: The Little River		**Water features** Spring head at Bearwallow Branch; power plant base at Jakes Creek; Camp Le Conte lakebed, dam remnants, and base of power plant; Appalachian Club swimming hole; underground cistern near Elkmont Town (current campground) *Photo Description:* View of Little River "swimming hole".	
Land use Cemeteries, recreation (swimming hole and campground), and transportation (roads) *Photo Description*: Elkmont Campground		**Buildings and structures** Wonderland Club area (hotel, annex, and cabins), Appalachian Club area (clubhouse and cabins in Daisy Town, Society Hill, and Millionaire's Row), and infrastructure (water tanks, utility lines, etc.) *Photo Description*: "Adamless Eden" playhouse in Daisy Town	
Circulation Old road to Gatlinburg via Fighting Creek Gap, roads into and throughout the District following removal of railroad tracks, and CCC stone bridge over Little River *Photo Description*: Little River stone bridge; view of east side		**Views and vistas** Axial views along watercourses and roads; partial panoramic views at Wonderland Hotel, at Cabins 58- 4d to 58- 9i, and near Cabin 40. *Photo Description*: View northwest from the Wonderland Hotel	
Topography and vegetation Flat land adjacent to watercourses, sloped areas and ridges, native trees and plants (successional forest), and non- native species planted by club residents *Photo Description:* Hemlock forest at Elkmont		*Photo Description:* Axial view along Little River Trail; view facing east from Millionaire's Row. Trail follows former bed of the Little River Railroad.	

resource studies (Thomason et al. 1993) that led to designation of the Elkmont Historic District, and archeological resources are not included in the Areas of Significance on the National Register of Historic Places nomination form. In a comment on a draft of the 1993 report and the nomination, the NPS explicitly stated its doubts about the potential for significant logging- era archeological resources at Elkmont:

> Because there is no indication of archeological testing to determine the presence of sub- surface resources, it is hard to accept that the area that was the Elkmont Lumber Camp is likely to yield information about the camp. It also seems unlikely that there would be surviving archeological resources because when the Town of Elkmont was moved and the railroad taken up, little was left behind. The road, trail, and other construction projects by the CCC and the construction of the present Elkmont Campground by the National Park Service in the 1950s would have destroyed archeological remains. For this reason, we do not believe that Criterion D should even be considered or mentioned in the National Register nomination (Brown 1993).

In keeping with the period of significance established for the District (1908–1940), the National Register of Historic Places nomination and accompanying cultural resource study (Thomason et al. 1993) do not mention the potential for prehistoric archeological materials within the District. There was also no mention of the potential for archeological remains associated with the non- logging- era historic occupations, including the pre- 1908 settlement period and the resort- era occupations associated with the Wonderland and Appalachian clubs.

In 1997, a NPS Southeast Archeological Center (SEAC) field crew conducted limited surveys of two small locations (the Elkmont Firing Range Privy Toilet and the Elkmont Campground maintenance shed) within the District. Both locations were found to be disturbed, and no additional work was recommended for those projects (Birdsong 1997). The first substantial NPS archeological work at Elkmont included surface reconnaissance and was conducted in 2001 by the Park Archeologist as a part of the initial baseline studies for the present project. Selected areas where visibility and terrain permitted were examined, with no subsurface examination and no collection of artifacts noted on the surface. Six areas were identified as having moderate to high probability for cultural materials One previously recorded site (40BT23) was located and seven other apparent site locations were identified, as well as a possible railroad grade and a well-preserved portion of an early historic period road. Due to the limited nature of the study, the sites were not registered with the state of Tennessee. It was concluded that a more intensive archeological investigation would be required prior to any ground disturbing activities at Elkmont.

The initial archeological reconnaissance for the project took place in April 2002, in conjunction with the geomorphological investigation. This work consisted of limited shovel testing of representative landforms and attempts to relocate the sites found by the Park Archeologist in 2001. Following this initial work, additional site testing was conducted later that year as part of the Park's "Experience Your Smokies" program (Webb 2002). Separate from the current planning process, Park staff conducted a limited survey in June 2003 in advance of the rehabilitation of two comfort stations in the Elkmont Campground. Finally, in November 2003 and March 2004, additional

archeological survey of selected parts of the District was conducted to determine the likely effect of the proposed management alternatives upon the District's archeological resources. The 2003 and 2004 work represents the most intensive archeological investigations carried out at Elkmont to date. The synthesis of the archeological findings is presented below and is based on the technical report of *Archeological Investigations in the Elkmont Historic District, Great Smoky Mountains National Park, Sevier County, Tennessee* prepared as part of the Section 106 compliance process (Webb and Benyshek 2004).

The combined investigations at Elkmont included limited surface collection and excavation of 467 shovel tests and one 1 x 1 m unit. A total of 108 (23.1 percent) of the shovel tests produced prehistoric artifacts, including three ceramic fragments and 485 chipped stone tools or debitage fragments (pieces of chipping debris that are the byproducts of stone tool production). Although few diagnostic artifacts were identified, the documented components appear to date primarily to the Archaic period. Woodland materials were identified in only three locations, and no Mississippian or Historic Cherokee materials were recovered. Historic period artifacts were recovered from 141 (30.2 percent) of the shovel tests. The 1146 historic artifacts consist primarily of bottle glass fragments and wire nails, but a variety of ceramic fragments and other materials were also found. Most of these materials are associated with the twentieth- century resort- era occupations of the Wonderland and Appalachian Clubs, although at least two appear to represent earlier home sites. The survey did not extend into the core of the former logging town of Elkmont (located in the current campground), and few, if any, artifacts associated with that occupation were recovered (Webb and Benyshek 2004).

Like most Southeastern tracts that are 350- acres or larger, the District contains evidence of numerous overlapping prehistoric and historic period occupations. This situation is exacerbated at Elkmont, which contains historic period artifacts or structural remains associated with over 100 former or standing buildings (including scattered nineteenth and early twentieth century buildings, a former town, several clusters of resort buildings and a Civilian Conservation Corps camp), as well as an abundance of prehistoric American Indian artifacts. Although the distribution of some of these remains appears to be limited by natural or cultural features, other distributions appear as continuous, or nearly continuous, scatters of artifacts that stretch across multiple landforms or around multiple buildings. The situation is further complicated by the presence of both prehistoric and historic materials at many locations, and in some cases distinct prehistoric artifact distributions are linked by a continuous historic artifact scatter. A final complicating factor is that the survey was limited in nature, and varied widely in intensity and scope across various parts of the District since it concentrated primarily on the areas with the most potential to be disturbed by the proposed alternatives. This parameter, and the lack of full delineation of essentially all identified artifact distributions, makes it even more difficult to define site boundaries.

In an attempt to identify workable site boundaries and facilitate management of the archeological resources in light of these conditions, the District has been divided into eight archeological sites (40SV120, 40SV121, 40SV122, 40SV123, 40SV124, 40SV125, 40SV165 and 40SV166) that together cover the entire 378- acre District. These sites are separated by topographic or drainage features, and in some cases also represent major historic subdivisions of the District. Each site contains both surveyed and unsurveyed

areas, as well as one or more concentrations or scatters of prehistoric and/or historic artifacts, each of which is designated a separate locus. Although the presently known resources are not continuous within some of the sites, it is reasonable to expect that continuous distributions would be identified if additional work was conducted. Tennessee State site forms have been completed for all sites in the District, and NPS Archeological Sites Management Information System site record forms will be completed for these sites at the conclusion of the project.

Since only part of the District has been surveyed, and the site boundaries are relatively artificial, it is also difficult to derive formal National Register of Historic Places-eligibility recommendations for the identified sites (although at least one site [40SV120] clearly contains significant deposits). Consequently, to facilitate project planning individual recommendations have been prepared concerning the potential need for additional work at each recognized locus and elsewhere at each site. These recommendations call for avoidance or additional work in all or parts of 12 of the 21 loci that may be affected by project activities, although impacts to the significant deposits at many, if not all, of those loci may be avoidable through project redesign or implementation of additional mitigation measures. In addition, supplemental survey will be required in the unsurveyed parts of the District if those areas are to be affected by project implementation or other land disturbing activities.

The eligibility of these resources has been evaluated according to the National Register of Historic Places Eligibility Criteria, as outlined in 36 CFR 60.4. The criteria state that "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and that:

> a) are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> b) are associated with the lives of persons significant in our past; or
>
> c) embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master, or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> d) have yielded, or may be likely to yield, information important in prehistory or history.

The regulations (36 CFR 60.4) also outline several additional criteria that affect National Register of Historic Places eligibility for certain types of properties:

> Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the

National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- a religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his productive life; or
- a cemetery that derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance; or
- a property achieving significance within the past 50 years if it is of exceptional significance.

In the absence of a formal redefinition of the District to include archeological resources and to extend the period of significance before 1908, these sites and loci are considered here as individual resources rather than as potential contributing resources to the District. It is recommended that such a redefinition take place, but those revisions are beyond the scope of the present work.

The eight identified archeological sites are described in detail (including mapped locations and other technical data) in the Section 106 report (Webb and Benyshek 2004). Due to the sensitivity of these resources and the need to protect them, however, location information about each site is presented here in only general terms.

Site 40SV120

Site 40SV120 is a multi- component prehistoric American Indian and twentieth century historic period site found on the terrace and alluvial/colluvial hill slopes on the east side of Jakes Creek in the southern part of the District. This site includes the Daisy Town and Society Hill areas of the former Appalachian Club resort, and contains 48 standing buildings, 33 of which are considered contributing resources to the District (Cleveland et al. 2002). Work at this site included excavation of 186 shovel tests, including 164 on the terrace along Jakes Creek and 22 on the hill slope deposits east of the creek. Fifty- four (28.9 percent) of the tests produced prehistoric artifacts, while 63 tests (33.7 percent) produced historic period artifacts. The positive shovel tests have been grouped into four loci.

Locus A. Locus A at 40SV120 contains prehistoric and historic period artifacts and deposits. Thirty- four (50.0 percent) of the 68 shovel tests in Locus A produced a total of 210 prehistoric lithic artifacts. Although no temporally diagnostic artifacts

were recovered, the predominance of quartz and quartzite and absence of ceramics suggest that most if not all of these artifacts date to the Archaic period. Many of the shovel tests encountered disturbed soils, but other shovel tests show some degree of stratigraphic integrity. Despite the obvious historic period modifications to this area, the data suggest that prehistoric deposits may maintain some degree of stratigraphic integrity in parts of this area. Based on these results, it is recommended that additional investigations be conducted to gather a larger sample of artifacts and further evaluate the prehistoric deposits in this area prior to any disturbance that might extend beneath A horizon soils, which are typically about 20 cm thick across the area.

Thirty- three (48.5 percent) of the 68 tests in Locus A produced a total of 205 historic period artifacts, all of which appear to date to the twentieth century occupation. Most of these materials are distributed as a generalized sheet midden, but artifact concentrations were found in three areas. It is recommended that two of those three areas be avoided or further evaluated prior to ground-disturbing activities.

Locus B. No prehistoric artifacts were recovered from the 14 shovel tests excavated in Locus B, but four (28.6 percent) of the tests produced a total of 25 historic period artifacts. This deposit appears to be a generalized sheet midden, representing the entire period of historic occupation in this area, and there are no indications of significant artifact concentrations or deposits. Consequently, no additional investigations of those deposits are recommended and no further work is recommended for this part of the site.

Locus C
Eleven (17.8 percent) of 62 shovel tests in Locus C produced a total of 24 prehistoric artifacts. Although no diagnostic artifacts were recovered most, if not all, of those artifacts presumably date to the Archaic period. Most of the shovel tests encountered disturbed profiles. This fact, along with the low artifact density and clear evidence of extensive historic period modifications, suggest that most, if not all, prehistoric deposits in this area have been extensively disturbed by historic period activities. Consequently, the prehistoric materials in this area are not considered to be of substantial research value.

Twenty- one (33.9 percent) of the 62 shovel tests in Locus C produced a total of 397 historic artifacts. Of those, 273 (68.8 percent) were recovered from a single shovel test, which encountered an intact pit feature that probably represents a pit or privy that was filled in the 1920s or 1930s. As a discrete refuse deposit associated with the early years of the Elkmont occupation, this feature has the potential to provide a variety of data concerning the material culture and lifestyles of the Elkmont inhabitants. Consequently, it should be protected from any ground- disturbing activities in this area.

Locus D
Nine (40.9 percent) of 22 shovel tests in Locus D produced a total of 101 prehistoric artifacts, primarily quartz or quartzite debitage fragments. Most shovel tests in this area encountered apparently undisturbed fine- grained

sediments extending to at least 70 cm below surface (cmbs). Additional information on the archeological potential of this area is provided by a test unit, which encountered an apparent Middle to Late Woodland period pit feature at the base of the plow zone (A horizon). Based on these data, it appears that Locus D contains prehistoric deposits that can provide information relevant to a variety of research questions. Although investigations in this area were limited, the entire site should be considered high- potential for archeological deposits except for a few eroded or otherwise obviously disturbed areas.

Only five (22.7 percent) of the 22 shovel tests in Locus D produced historic period artifacts. None are believed to represent significant deposits, although it is possible that more substantial deposits might exist elsewhere in that area.

In summary, Site 40SV120 contains a variety of prehistoric and historic period deposits, some of which appear to have appropriate integrity, clarity and contents to provide information relevant to substantial research questions. Consequently, the site is recommended eligible for the National Register of Historic Places and should be considered a contributing element to the District. If further investigation is not undertaken at these areas, the areas should be protected from future ground- disturbing activities associated with the proposed project or for other, unrelated projects. Other parts of the site do not appear to contain significant deposits, and no further archeological work is recommended in those areas.

Site 40SV121

Site 40SV121 is a multi- component prehistoric American Indian and nineteenth to twentieth century historic period site on the west side of Jakes Creek in the southern part of the District. The site is located on terrace, alluvial/colluvial hill slopes, and upland landforms. The combined survey at 40SV121 included excavation of 13 shovel tests. Seven of the tests were excavated in the southern part of the site during the 2002 investigations; the other five tests were excavated in the northern area in 2004. Five (38.5 percent) of the tests produced prehistoric artifacts, while a single test (7.7 percent) produced historic period artifacts. The positive shovel tests have been grouped into two loci.

Locus A

Locus A is situated in the southern part of 40SV121, and includes a standing stone chimney mortared and a stacked stone wall. A number of stone piles are also present nearby and are probably related to the historic period occupation as well. Prehistoric and historic artifacts were recovered from one (14.3 percent) of seven shovel tests excavated in this part of the site. The investigations in Locus A were extremely limited, and did not define the boundaries of either the prehistoric or historic period components in the area. Additional work will be necessary to complete identification and evaluation of those resources should impacts be planned as part of the current project or any future work.

Locus B

Locus B is in the northern part of 40SV121, on hill slope deposits. Four (80 percent) of five shovel tests excavated there recovered a total of 13 quartz debitage fragments. Artifacts were found in both the topsoil (A horizon) and the

underlying B horizon. The work at Locus B was extremely limited, and did not define the boundaries or nature of the prehistoric component in this area.

The survey at 40SV121 was extremely limited, and was not sufficient to characterize the resources in this area or to support a recommendation concerning the site's research potential or eligibility for the National Register. In the event that impacts are proposed outside previously disturbed areas of this site, additional work is recommended to complete identification and evaluation of this resource.

Site 40SV122

This site is a multi- component prehistoric American Indian and twentieth century historic period site located in the southeastern portion of the District. The combined survey at 40SV122 included the excavation of 79 shovel tests. Fifteen (19.0 percent) of the tests produced prehistoric artifacts, while 35 tests (44.3 percent) produced historic period artifacts. The positive shovel tests have been grouped into four loci.

Locus A

Locus A at 40SV122 is situated in the western part of the site, and includes both prehistoric and historic artifact distributions. Thirteen (43.3 percent) of 30 shovel tests in Locus A produced a total of 29 prehistoric artifacts, including a small ceramic sherd that probably dates to the Early to Middle Woodland period. The data indicate that low to moderate density intact prehistoric deposits are present in at least part of Locus A. The significance and research potential of those deposits cannot be determined based on the available data. Consequently, additional work will be needed to further evaluate those deposits prior to any ground- disturbing activities in that area.

Seventeen (56.7 percent) of the 30 shovel tests in Locus A produced historic artifacts. All appear to date from the early to mid twentieth century, although none are highly diagnostic. Artifact density ranged from one to 16 artifacts per positive shovel test, with no clear pattern in the distribution of the materials. Nine of the 13 shovel tests that produced prehistoric artifacts also produced historic materials. The historic period artifacts at Locus A appear to represent a variable- density secondary refuse deposit. Due to the redeposited nature of these materials and the inability to link them with specific cabins or activities, this artifact distribution is not believed to be of substantial research value. Consequently, no additional investigations (other than monitoring during any construction activities) are recommended in association with the historic component of this locus, as it is currently defined.

Locus B

Locus B at 40SV122 is in the northern part of the site. Two (18.2 percent) of 11 shovel tests in Locus B produced single quartz debitage fragments; both were recovered from the A horizon. This low- density artifact distribution likely dates to the Archaic period, and is not considered to be of substantial research value or merit further consideration.

Four (36.3 percent) of the 11 shovel tests in Locus B produced a total of 15 historic period artifacts, all of which appear to date from the early to late- twentieth

century. The historic period deposits appear to represent a variable- density sheet midden. Although these materials probably derive from activities in specific cabins, the deposits do not appear to have the potential to provide data relevant to substantive research questions, and are not considered to be of research value. Consequently, no additional investigations (other than monitoring during construction) are recommended in association with the historic component of this locus, as it is currently defined.

Locus C

Locus C at 40SV122 is situated in the eastern part of the site. No prehistoric materials were discovered in this area, but a moderate density historic period artifact distribution was identified. Twelve (52.2 percent) of 23 shovel tests in Locus C produced a total of 46 historic period artifacts, all of which appear to date to the early to- mid twentieth century. The historic period deposits in this locus are clearly secondary in nature, but are of unknown origin. It is possible that some or all of these artifacts were included in fill that was deposited to raise the level of a roadway at some point during the resort- era occupation. Due to their redeposited nature and uncertain origin, these deposits do not appear to have the potential to provide data relevant to substantive research questions, and are not considered to be of research value. Consequently, no additional investigations are recommended in association with the historic component of this locus, as it is currently defined.

Locus D

Locus D at 40SV122 is in the northern part of the site. No prehistoric materials were discovered in this area, but two of five shovel tests produced historic artifacts. These artifacts are not considered to represent a significant deposit, and no additional investigations are recommended in association with this component as it is currently defined.

Most of 40SV122 remains unsurveyed. In addition to potential prehistoric resources, the site could contain historic period resources associated with four pre- Little River Lumber Company buildings or other logging or resort- era occupations.

40SV123

Site 40SV123 is a multi- component prehistoric American Indian and twentieth century historic period site located in the northeastern portion of the District. This site lies outside the areas of dense development associated with the logging- and resort- era activities at Elkmont. The combined survey at 40SV123 included the excavation of 10 shovel tests, all but one on hill slope deposits near a cabin. Five (50.0 percent) of the tests produced prehistoric artifacts, and the remaining five (50.0 percent) produced historic period artifacts.

Locus A

Locus A includes an area where prehistoric lithic debitage fragments were recovered from the surface during the 2002 reconnaissance. Due to the current land use, no shovel tests were conducted in part of the area. A single shovel test excavated on the ridge top to the west recovered no artifacts.

The work in Locus A was extremely limited, and did not define the boundaries of the prehistoric artifact distribution. Although the prehistoric deposits in one area are clearly highly disturbed, it is possible that intact deposits are present in the surrounding area. Additional work will be necessary to complete identification and evaluation of resources in that area should impacts be planned as part of the current project or any future work.

Locus B

Locus B at 40SV123 is located near a cabin, and produced both prehistoric and historic period materials. Five (55.5 percent) of nine shovel tests in Locus B produced a total of seven quartz and five chert debitage fragments. No diagnostic artifacts were recovered, but the relatively high percentage (41.7 percent) of chert may indicate the presence of a Woodland component. Although some of the tests encountered a thin layer of historic fill, debitage fragments were recovered from what appeared to be intact strata.

The work in this area was limited, and did not define the boundaries of the prehistoric artifact distribution or adequately assess its integrity. Although the area has been somewhat disturbed by the historic period occupation associated with a cabin, it is possible that intact deposits are present. If ground- disturbing activities are proposed in this location as part of the current project or any future work, additional work will be necessary to complete identification and evaluation of this component.

The historic period deposits near the cabin appear to represent a low- density sheet midden similar to that found around other cabins at Elkmont. Although these materials probably derive from activities in this specific cabin, the deposits do not appear to have potential to provide data relevant to substantive research questions, and are not considered to be of research value. Consequently, no additional investigations are recommended in association with the historic component of Locus B as it is currently defined.

In summary, Site 40SV123 contains prehistoric components in at least two locations. The prehistoric deposits at both Locus A and Locus B are poorly defined, and require additional evaluation. For this reason, both areas should be protected from future ground- disturbing activities, either related or unrelated to the present project. In addition, further investigations will be required should potential ground- disturbing activities be planned in other parts of the site.

40SV124

Site 40SV124 is a prehistoric American Indian and twentieth century historic period site in the northwestern part of the District The combined survey at 40SV124 included the excavation of 24 shovel tests. Six (25.0 percent) of the tests produced prehistoric artifacts, and two (16.7 percent) produced historic period artifacts. Two artifact distributions have been identified.

Locus A

A total of seven quartz debitage fragments were recovered from two shovel tests in Locus A in 2002. No diagnostic artifacts were found, but the predominance of

quartz suggests an Archaic occupation. The work in this area was limited, and did not define the boundaries of the prehistoric artifact distribution or adequately assess its integrity. Although part of the area has obviously been disturbed by construction, it is possible that intact deposits are present. Additional survey and site evaluation is recommended prior to performing any ground- disturbing activities.

The historic component of Locus A represents the remains of the former Elkmont sewage system, and consists of an earthen embankment with an associated array of concrete piers holding up an iron pipe running across the former pond area. In addition, a small number of ceramic artifacts were recovered from the surrounding area. The limited work conducted in this area did not adequately document the former sewer system and the associated deposits, and additional work is recommended prior to any ground- disturbing activities.

Locus B
Four (19.0 percent) of 21 shovel tests excavated in this area produced a total of four debitage fragments. No diagnostic artifacts were recovered. The intensive shovel testing has adequately assessed the prehistoric deposits in this area, which appear to lack research value. Consequently, no additional work is recommended.

Like the other sites, most of 40SV124 remains unsurveyed. In addition, the prehistoric and historic period deposits at Locus A are poorly defined and require additional evaluation. That locus should be protected from future ground- disturbing activities, either related or unrelated to the present project, although no additional work is recommended as part of the potential construction in Locus B. Finally, further investigations will be required should potential ground- disturbing activities be planned in other parts of the site.

40SV125
Site 40SV125 is a prehistoric American Indian and nineteenth to twentieth century historic period site in the western part of the District. This site lies across Little River from the former area of dense development associated with the Little River Logging Company logging town of Elkmont, and never witnessed the same degree of development seen in that area. At least three buildings were located on the site prior to 1907 and the advent of the lumber company.

The combined survey at 40SV125 included the excavation of 48 shovel tests. Seven (14.6 percent) of the tests produced prehistoric artifacts and seven (14.6 percent) produced historic period artifacts. Artifacts were also collected from the surface in two areas. Artifacts were found in six locations, designated Loci A- F.

Locus A
A total of seven artifacts were recovered from two shovel tests in Locus A, including a chert Morrow Mountain projectile point (Middle Archaic period) and six debitage fragments. The work in this area was limited, and did not define the boundaries of the prehistoric artifact distribution or adequately assess its

integrity. Additional survey and site evaluation is recommended prior to any ground- disturbing activities.

Locus B
Locus B is located on a wooded rise on the terrace, and contains to early twentieth century house site. Two (33.3 percent) of six shovel tests excavated on this rise a total of 10 artifacts, including an apparent Late Archaic projectile point. Artifacts were recovered from the A horizon only. Work in this area was limited and although the boundaries of the artifact distribution appear to be defined by the landform, the investigations were not sufficient to assess the component's integrity or research potential. Additional survey and site evaluation is recommended prior to performing any ground- disturbing activities.

The historic component at this locus includes a square stone chimney base as well as an associated low- density artifact scatter. Historic period artifacts totaling 65 items were found in five (83.3 percent) of six shovel tests. As with the prehistoric component, the work in this locus was not sufficient to assess the component's integrity or research potential. Additional survey and site evaluation is recommended prior to any ground- disturbing activities.

Locus C
Locus C is situated north of Locus B, and contains low- density prehistoric and historic period artifact scatters. One (20.0 percent) of five shovel tests excavated in this area produced a single quartz debitage fragment from an apparent disturbed context. Although no attempt was made to delineate the boundaries of this locus, it does not appear to represent a significant resource as currently defined, and no additional investigations are recommended. However, additional survey would be necessary if impacts would potentially extend outside that corridor.

Two (40.0 percent) of the five shovel tests excavated in this area produced a total of 14 historic period artifacts. No attempt was made to delineate the boundaries of this locus, and it is possible that it represents a pre- campground occupation. Consequently, additional survey and site evaluation is recommended prior to any ground- disturbing activities in this area.

Locus D
Most of the prehistoric artifacts from this locus were found on the surface of a distinct rise. No shovel tests were excavated on the landform, as it was outside the area potentially impacted by construction. In addition to those artifacts, two quartz debitage fragments were found in one (25.0 percent) of four shovel tests excavated nearby. Those artifacts came from apparent fill. No attempt was made to systematically investigate or define the boundaries of the artifact distribution on the rise, and additional survey and evaluation would be necessary if it was to be impacted by ground- disturbing activities. However, the artifacts found adjacent to the road came from apparent fill deposits, and no additional work is recommended in that area.

Fifteen historic artifacts were also found on the rise. The limited artifact collection is clearly biased towards easily visible, potentially diagnostic items, but appears to represent a late nineteenth to early twentieth century occupation. No attempt was made to systematically investigate or delineate the boundaries of this locus. Consequently, additional survey and site evaluation is recommended prior to any ground- disturbing activities in this area.

Locus E
Locus E is situated at the southern end of the site, where a debitage fragment was recovered from the single shovel test. Although this artifact came from an apparently intact context, it does not appear to represent the presence of a significant deposit within the survey corridor. No further work is recommended in that area, but additional survey and site evaluation is recommended if ground-disturbing activities extend to the north.

Locus F
Locus F is situated in an open area at the northern end of the site, where a single wire nail fragment was recovered from one of five shovel tests in this area. This artifact does not appear to represent a significant component and no further work is recommended in that area.

In summary, Site 40SV125 contains five known prehistoric components and four known historic components, many of which require additional evaluation. A large part of the site remains unsurveyed, and additional prehistoric and historic components could also be present.

40SV165
This site is located on floodplain, terrace and hill slope landforms in the eastern part of the District. Most of the area is lightly wooded. The limited survey at 40SV165 included the excavation of 11 shovel tests. One (9.1 percent) of the tests produced prehistoric artifacts. No historic period artifacts were recovered.

Locus A
Only one of five shovel tests excavated in this area produced artifacts, all of which were found in fill deposits. The origin of these artifacts is unknown, but they clearly do not represent an in situ resource. Consequently, no additional work is recommended along the utility corridor in this area.

Like the other sites, most of this new site remains unsurveyed. In addition to potential prehistoric resources, the site almost certainly contains a variety of subsurface remains associated with the Little River Lumber Company town of Elkmont.

40SV166
Located on terrace, alluvial/colluvial hill slopes and uplands, 40SV166 is a newly identified prehistoric American Indian and twentieth century historic period site in the northeastern part of the District. Most of the area is wooded, although there are some grassy and cleared areas adjacent to the buildings. The combined survey at 40SV166 included excavation of 82 shovel tests. Fifteen (18.3 percent) of the tests produced

prehistoric artifacts, and 27 (32.9 percent) produced historic period artifacts. The recovered materials have been grouped into four loci.

Locus A

Locus A at 40SV166 is situated primarily on the upland ridge and the adjacent hill slopes leading down to the terrace. Seven (15.9 percent) of 44 shovel tests in this locus produced prehistoric artifacts, consisting of a total of 16 quartz debitage fragments. Based on the predominance of quartz, the component presumably dates primarily to the Archaic period. The shovel test with the highest density of artifacts was one of two tests located on a distinct bench partway down the hill slope, where there is some potential for intact artifact distributions and perhaps features. Consequently, additional survey and site evaluation is recommended if ground- disturbing activities extend into that area. None of the other shovel tests excavated elsewhere on the ridge produced more than two prehistoric artifacts, and most encountered disturbed and/or eroded soils. Evidently, the intense historic period activities have disturbed any deposits that may have been present in this part of the component. For this reason, no additional investigations are recommended in that area.

Seventeen (38.6 percent) of the 44 shovel tests produced historic period artifacts, which appear to represent a dispersed artifact scatter or sheet midden that extends across the entire area. All of the materials were found in the surface or A horizon, and there was no evidence of significant artifact concentrations or unmixed deposits. Based on this pattern, no additional work is recommended in the investigated part of this area, subject to the constraints and recommendations provided below.

Locus B

Locus B at 40SV166 is situated on a narrow terrace located at the base of a ridge. Four (66.6 percent) of six shovel tests excavated in this area produced a total of 10 prehistoric artifacts, including two ceramic sherds dating to the Woodland period. Artifact density ranged from one to six artifacts per positive shovel test, and the artifacts were recovered from depths of up to at least 100 cmbs.
The prehistoric cultural deposits at this site appear undisturbed, and there is potential for intact Woodland period artifact distributions and perhaps features on this landform. Consequently, additional survey and site evaluation is recommended prior to any ground disturbing activities in this area.

Two of the six shovel tests produced historic period artifacts. These artifacts were recovered from the upper strata, above the strata that produced the prehistoric artifacts. These materials appear to represent intermittent refuse disposal in this area, and are not considered to warrant additional interpretation.

Locus C

Locus C at 40SV166 is situated on a terrace and parts of this area are maintained as lawn, while other parts are wooded. Four (11.1 percent) of 39 shovel tests excavated in this area produced a total of nine prehistoric artifacts. Essentially all of the shovel tests in this area encountered disturbed soils, and there is considerable surface evidence of ground disturbance and erosion across parts of

this area. Based on the low artifact density and evidence of disturbance, no additional investigations of this component are recommended.

Five (12.8 percent) of the 39 tests produced a total of 15 historic period artifacts. Artifact density ranged from one to eight artifacts per positive shovel test. These materials derive from one or more of the documented twentieth century uses of this area, and there are no indications that they represent an intact deposit. Consequently, no additional investigations of this component are recommended.

Locus D
Locus D at 40SV166 is situated in an area that was reportedly used as a septic drain field and as a refuse dump during the mid- twentieth century. Large numbers of historic period artifacts were observed eroding out of the riverbank at the west edge of this area, and three of seven shovel tests excavated above the riverbank also encountered historic period artifacts. No similar artifact deposits were encountered in Locus C, indicating that this deposit is limited to the Locus D area.

This deposit appears to represent a secondary refuse deposit that can be associated with the twentieth- century use of nearby resort facilities. As such, it has the potential to provide data concerning activities that took place at the site, and additional survey and evaluation are recommended if ground- disturbing activities extend into this area.

In summary, 40SV166 contains three known prehistoric components and four known historic components, many of which require additional evaluation. Like the other sites, much of 40SV166 remains unsurveyed. In addition to potential prehistoric resources, it is possible that unsurveyed parts of this site contain additional intact remains associated with the Wonderland Club development.

Summary of Results and Recommendations for Archeology
The archeological work conducted at Elkmont, despite its limitations, has provided pertinent data concerning the archeological remains present, and has established a framework for recording and, to some extent, evaluating, additional materials that are likely to be found in the future. The eight identified sites at Elkmont include a variety of prehistoric and historic period materials. The most extensive prehistoric materials consist of quartz debitage, which constitutes a nearly ubiquitous scatter across most surveyed parts of the terraces and alluvial/colluvial hill slopes; chert is a relatively minor constituent compared to most of the quartz distributions. Although only two diagnostic artifacts were found (a chert Morrow Mountain point and a quartz Late Archaic stemmed point), most of this debitage are considered likely to date to the Middle and Late Archaic period. There are indications of intact subsurface remains associated with these components in a few areas (such at 40SV120 Locus A and 40SV121 Locus B), and it is likely that significant Archaic period deposits are present in several areas of the District.

Woodland period remains have been documented at three locations: on the hill slope deposits at 40SV120 Locus D, on the terrace at 40SV122 Locus A and at 40SV166 Locus B. The materials at 40SV120 Locus D are known to date to the Middle to Late Woodland

periods, and occur in association with a pit feature. This locus clearly has the potential to provide significant data concerning the Woodland occupations of the Little River valley. Less information is available concerning the other two components, although the component at 40SV166 appears to have the potential to contain significant deposits.

No Mississippian or Historic Cherokee materials were recovered. Although it is possible (and perhaps likely) that some such deposits are present in unsurveyed parts of the District, this pattern likely represents a lessened intensity of occupation of this upland valley during these periods.

As expected, most of the historic period remains from Elkmont date to the twentieth century, a period that witnessed an explosion in use of the valley associated with the Little River Lumber Company logging town of Elkmont, the resort- era occupations at the Wonderland and Appalachian clubs, and the establishment of successive Boy Scout, private, Civilian Conservation Corps and NPS campgrounds. Since the survey was concentrated in the Wonderland and Appalachian club areas, most of the recovered historic artifacts are associated with those occupations. Most of those artifacts were recovered from diffuse sheet middens that are present in most occupation areas. Those deposits contain mixed materials, from up to 80 years of occupation, and are generally considered to have little research potential. However, discrete deposits with research potential were identified in association with three buildings. It is likely that similar deposits are present in the vicinity of other buildings, but occur as discrete features that are not easily identified in shovel testing.

The survey work recorded structural remains associated with two of the pre- Little River Lumber Company buildings at Elkmont. Although the investigations at each locus were limited, the remains at those and similar home sites certainly have research potential. Very little work was conducted at the former Elkmont town site, and essentially no artifacts were recovered that can conclusively be associated with that occupation. Although the former town site is believed to have considerable research potential, this remains to be demonstrated through additional research or compliance-oriented work.

3.1.3 Area of Potential Effects

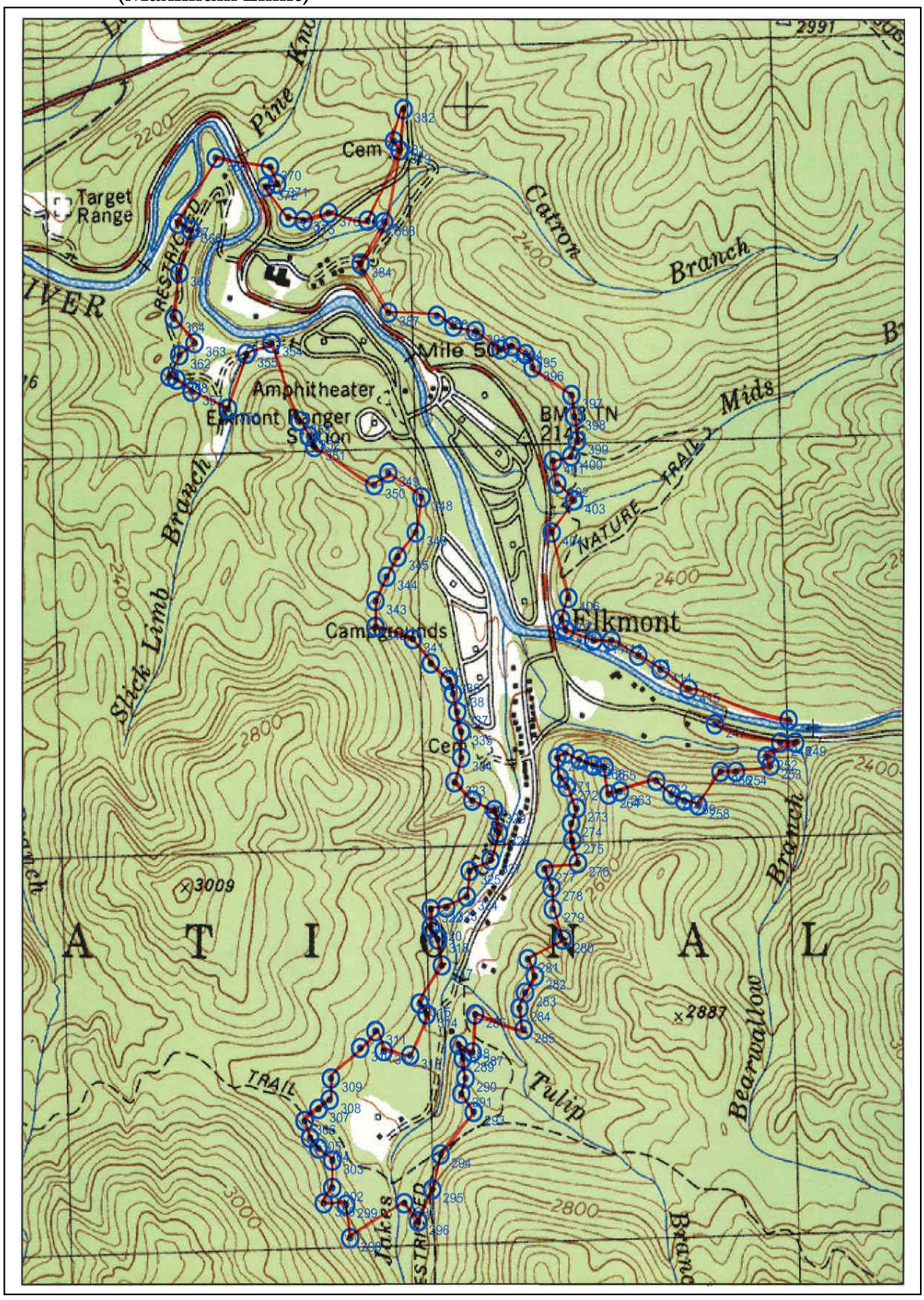
The Area of Potential Effects (APE) is a cultural resources concept that is specific to Section 106 of the National Historic Preservation Act mandate to identify a project's potential impact area (36 CFR 800.4[a][1] and 800.16[d]). Most simply put, it is that area that includes all the direct effects (for example, removal of the buildings that are considered contributing to the District) and all the indirect effects (for example, an increase in visitation to the District) that could result from implementation of any of the proposed alternatives. The visual limit into the District is defined by a string of points encircling the District from which one can look into and no longer observe anything manmade. This visual limit constitutes the maximum APE for the Elkmont project and encompasses the maximum area of potential change. The location of the boundary defining the APE may constrict or expand dependent upon the alternative selected for implementation; however, no boundary will go beyond the maximum APE/visual limit line.

The maximum APE was delineated in the winter (2003) when the leaves are off the trees and the cultural landscape of the District is most visible. Figure 3- 1 illustrates the maximum APE. The small circles on the figure indicate where map coordinate readings were made, and the boundary was drawn by connecting these points of observation. These points are at the elevation from which one cannot see the buildings, structures, and roads at Elkmont. For the most part, the maximum APE for the management alternatives proposed for the District is within or borders the physical boundary of the District as described in its nomination. It extends outside the District nomination boundary at its most southern end (near the area of the NPS horse barn) due to the flatter topography in this part of the District.

Chapter 2 of this document provides a detailed description of each alternative. The proposed management alternatives for the District that have the largest APE are the "No Action Alternative" (implementation of the current General Management Plan) and Alternative A. The "No Action Alternative" would remove all historic buildings within the District and leave only remnants of cultural landscape features such as stone walls that would not pose a safety hazard. Alternative A would do the same, except all foundations would be removed to ground level as would many of the cultural landscape features. These two alternatives would have the largest APE because they would cause the most visible change within the Elkmont Historic District.

In addition to determining the APE for cultural resources, a visual quality assessment was performed within and adjacent to the District as part of this planning process. The visual quality assessment was performed because the overall visual quality of the District not only considers cultural resources, but relates to and considers all other resources as well. In determining the environmental consequences that could result from implementation of any of the proposed alternatives, potential impacts to all resources are described. In this analysis, the area of potential effects for other resources does not necessarily coincide with that of cultural resources. Environmental consequences are described in terms of the potential for direct, indirect and cumulative effects and must consider each resource in its own context. As such, analysis of environmental consequences may extend well beyond the cultural resource APE, especially if a resource that may potentially be affected by project implementation is rare within the region, the Park, or globally. Therefore, the APE was defined to comply with Section 106 of the National Historic Preservation Act, whereas the viewshed analysis was performed to gather existing information for the NEPA process. This process is described in detail in Section 3.5.1 of this document.

Figure 3- 1: Area of Potential Effects for Elkmont Historic District Cultural Resources (Maximum Limit)



3.2 Natural Resources

3.2.1 Physical Geology

The rocks that underlie the Park and vicinity are part of the western Blue Ridge Geologic Province in the southern Appalachians. Most bedrock in the Park consists of a thick mass of variably metamorphosed sedimentary rocks of late Precambrian age. The dominant units underlying the Little River watershed are the Elkmont and Thunderhead Sandstones, which are massive, thick- bedded, feldspathic sandstones, composed of detrital quartz, potassium feldspar, and plagioclase and metamorphic biotite, muscovite and chlorite. Bedrock in many areas of the basin is overlaid by deposits of alluvium, colluvium and saprolite that are locally up to 30 meters (m) [98.4 feet (ft)] thick (Mast and Turk 1999). The bedrock underlying the portion of the watershed which contains the District is composed of less metamorphosed rock (slates, sandstones and metasiltstones) of the Thunderhead formation. The sedimentary bedrock is late Precambrian, about 500 million to 1 billion years old.

Processes of erosion and deposition formed the landscape within the District. Rocks and sediments moved from higher elevations through landslides; in addition, water also left sediment deposits. The contemporary landscape probably formed during periods of colder and/or wetter climate thousands of years ago. Movement of rock and sedimentary material probably occurred during the late Pleistocene through middle Holocene period. There is no evidence to suggest the exact mode of placement of landscape material, although data from the Ravensford Tract in the Oconaluftee drainage indicates that debris flows sufficient to move boulders could have been fairly common during the early and middle Holocene period. Some of the mass- wasted sediment was likely deposited during the last glacial maximum under periglacial climatic conditions. Volume estimates are not possible, as the entire basin would have to be studied in order to estimate sediment yield given the small areal focus of the District. The elevation of boulders in the low terrace indicates that the streambed was slightly higher than it is now (1- 2 m), and that it was carved out to its present elevation during the latter half of the Holocene period. However, absolute dating techniques would be necessary to confirm this hypothesis (Webb 2002).

3.2.1.1 Geomorphology

A geomorphic reconnaissance within the District boundaries was conducted to identify the major landforms present. Five principal landforms were identified, including: (1) the floodplain; (2) a low terrace; (3) high terrace remnants; (4) alluvial/colluvial hill slope deposits; and (5) rocky upland slopes. Each landform type is discussed below in terms of its sedimentation history.

<u>Floodplain</u>

The floodplain is the alluvial land surface that is being constructed by the modern regime of the Little River and its tributaries. It is the first distinct alluvial surface above the river and stream channels. The highest elevation of this surface ranges from about 0.5 to 2.0 m (1.6 to 6.5 ft) above the base flow water level of the river and its tributaries. The floodplain tends to be a narrow corridor of land, which indicates that the river and streams have not been graded to this elevation for a very long period of time. The floodplain probably receives new sediment (historical in age) during relatively frequent overbank flood events (every 0.5- 5.0 years). The youngest parts of this surface consist of

imbricated boulders and cobbles, whereas the older parts have a layer of sand and silt over the cobbles that are typically less than 50 cm (19.7 in) thick. No auger holes were drilled into the floodplain deposits, but observations were made from cut banks along the active channel.

Low Terrace

The low terrace is the first widespread alluvial surface with increasing elevation above the floodplain. The average top elevation is at about 1.5 to 3.0 m (4.9 to 9.8 ft) above the baseflow water level, but it can be as high as 4.0 m (13 ft). There is considerable topographic relief on this surface since boulder bars and intervening swales are common. This is the most extensive alluvial surface in the valley at Elkmont, and makes up most of the area where the Elkmont Campground and buildings are situated. Some relatively low swales on this surface are probably the only portions of this landform that have received overbank flood sediment over time. This surface exhibits many very large boulders [some in excess of 2.0 m (6.5 ft) in diameter], indicating that debris flows were an important sediment source for the alluvium and flooding on a much larger scale than what is presently experienced were likely responsible for sedimentation of this surface.

Five auger holes were drilled into the low terrace. Each hole exhibited a silty to sandy layer of sediment less than 1.0 m thick that overlies cobbles and boulders. Locations of those auger tests are mapped in the 2002 baseline report (Webb 2002). In some places, cobbles and boulders are at the surface and completely lack a fine- grained stratum. The soil traits indicate that the low terrace is probably from the Holocene period. This surface exhibits characteristics that correlate closely to those of the first terrace at the confluence of Raven Fork and the Oconaluftee Rivers on the east side of the Park, which has been dated to 3,000 to 8,000 calendar years old (Webb 2002).

High Terrace Remnants

Small remnants of high terraces occur sporadically throughout the District. The largest remnant occurs in the amphitheater area, but it appears to be covered with a layer of hill slope sediment at that location. Other patches of high terrace remnants were too small to map at the scale investigated. The available outcrops exposing this unit indicated a much greater degree of soil weathering than was seen in the low terrace. These high terrace remnants represent a much higher elevation of the stream base level in the past. All available evidence (profile weathering and stratigraphic relation to the low terrace) suggests that this surface is Pleistocene in age.

Alluvial/Colluvial Hill Slope Deposits

Alluvial/colluvial hill slope deposits are aprons of colluvium and alluvium along the sides of the valleys. They have been transported from the uplands and redeposited in the lower back slope, foot slope, and toe slope positions. Many of the hill slope deposits occur as lobes of sediment that emerge from small first and second- order tributaries upon entry to the main valley of the Little River and Jakes Creek. The thickness of the hillslope deposits is not well known. Since cobbles and boulders were always encountered in auger holes, the depth of analysis within this unit was restricted.

Seven auger holes were drilled into hill slope deposits. These hill slope deposits are essentially identical to the Holocene hill slope sediments that were radiocarbon dated as part of the geomorphic investigations of the Ravensford Tract in the Oconaluftee

drainage (Webb 2002). Unlike the valley at Ravensford, an older phase (Pleistocene) of hill slope deposition was not identified at Elkmont, and it appeared that the majority of these deposits are from the Holocene period. A buried A horizon was found in one auger hole, indicating that the youngest of these deposits is historical in age. It is also apparent that some of the older Holocene hill slope sediments have been somewhat dissected and appear as low spurs of foot slope deposits protruding into the valley in some localities.

It is possible that the hill slope deposits could contain artifacts associated with Paleoindian populations (circa 12,000 years old) or later time periods. In addition, unoxidized sediments that could be present within or sealed beneath such deposits could potentially contain intact plant subfossils that could provide information on past environments in the Elkmont vicinity.

Rocky Upland Slopes

The rocky upland slopes are the hill slopes that consist of bedrock and saprolite with a thin veneer of colluvium. Much of this sediment is rather coarse, consisting of angular cobbles and gravel.

3.2.1.2 Soil Characteristics

Most soils in the watershed are classified as Inceptisols that are fairly deep, well- drained soils developed in residuum weathered from the underlying bedrock (NPS 2002b). Chemically, these soils tend to be acidic (pH 4.1 to 5.8), with low organic content and low cation- exchange capacities (NPS 2002b). The exchange complex is almost entirely derived from the organic matter and is generally dominated by aluminum.

The U.S. Department of Agriculture- Natural Resources Conservation Service (NRCS) is mapping soils in the Park. Soil mapping for Sevier County, including the District, has not yet been published, but is available in draft form (Figure 3- 2). A description of the soils found in the District follows (Khiel 2002 and Khiel Pers. comm. 2004):

- The floodplain, low terrace, and alluvial/colluvial landforms are composed of Spivey- Santeetlah- Nowhere complex. This complex is found in the Daisy Town, Millionaire's Row, Society Hill and Campground areas within the District. Slopes vary from 2 to 8 percent, 8 to 15 percent, and 15 to 30 percent. The Spivey soil series consists of very deep, well drained, cobbly soils in long narrow areas in valleys, and coves in mountainous areas. Formed in colluvium from metasedimentary rock (mostly sandstone of the Thunderhead formation), they are classified as loamy- skeletal, mixed mesic Humic Dystrudepts. The Santeetlah series consists of very deep, well- drained, moderately rapidly permeable soils on benches, fans, and foot slopes in coves in mountainous areas. They formed in colluvium from metasedimentary rock (phyllite, slate, and sandstone). They are classified as coarse- loamy, mixed, mesic Humic Dystrudepts. Spivey and Santeetlah soils have thick, dark surface layers, and are very deep. Spivey soils also have more than 35 percent rock fragments in the subsoil and make up about 20 percent of the map unit.

- The high terrace landform is composed of Lonan loam, with 8 to 15 percent slope and 15 to 30 percent slope. This soil unit is found in the area west of Daisy Town near Jakes Creek Cemetery and in the Wonderland Hotel area. This map unit

consists of deep to very deep Lonon soils on sloping colluvial benches and fans. These soils are well drained. Mapped areas are remnants of once larger colluvial deposits from the surrounding mountains. Permeability is moderate and there is very little runoff in forested areas where leaf litter has not been fully or partially disturbed. Runoff is rapid in non- forested area. The water table is more than 6 feet below the surface.

- The rocky upland slopes are composed of Soco- Stecoah complex, with 30 to 95 percent slopes. Within Elkmont Historic District, this complex is found in the northeast part of the District south of the Catron Branch and east of the Little River Road. This soil type consists of moderately deep Soco soils and deep Stecoah soils on very steep south- to- west facing side slopes in the intermediate mountains. Both soils are well drained. Mapped areas are irregularly shaped and range from 2 to 20 ha (5 to 50 acres). These soils are too intricately mixed and small in size to separate them in mapping. Permeability is moderately rapid. Surface runoff is slow where forest litter has not been disturbed and is rapid where litter has been removed.

  Other than Lonan loam (15 to 30 percent slopes) described above, most of the Wonderland Hotel area consists of the Junaluska- Brasstown complex (15 to 30 percent slopes). Soils in this map unit include moderately deep Junaluska soils and deep Brasstown soils. Both soils are found on moderately steep south to west facing hill slopes and are well drained. Areas with these soil types are long and narrow, covering areas from 2.0 to 20.2 hectares (5 to 50 acres). Junaluska soils usually comprise 35 to 45 percent of this soil unit, while the Brasstown soils portion is 35 to 45 percent. The two soils occur together with areas of each too small to accurately separate them for mapping. These soils are moderately permeable. Areas where there has been significant ground disturbance exhibit rapid runoff of precipitation, while runoff in areas that remain covered by leaf litter is slow.

  Small areas of Santeetlah, Spivey, and Tsali soils are also included in this soil unit. Santeetlah and Spivey soils are found along drainageways and have dark surface layers. The subsoil layer of Spivey soils is comprised of more than 35 percent rock fragments. In addition, Santeetlah and Spivey soils are very deep to weathered bedrock. Tsali soils are on highly divided areas and are shallow to weathered bedrock. Approximately 20 percent of the soils in this map unit are comprised of these soil types.

  Soils similar to Junaluska and Brasstown soils are also included in this map unit and may have a rockier surface layer or subsoil layers that are browner.

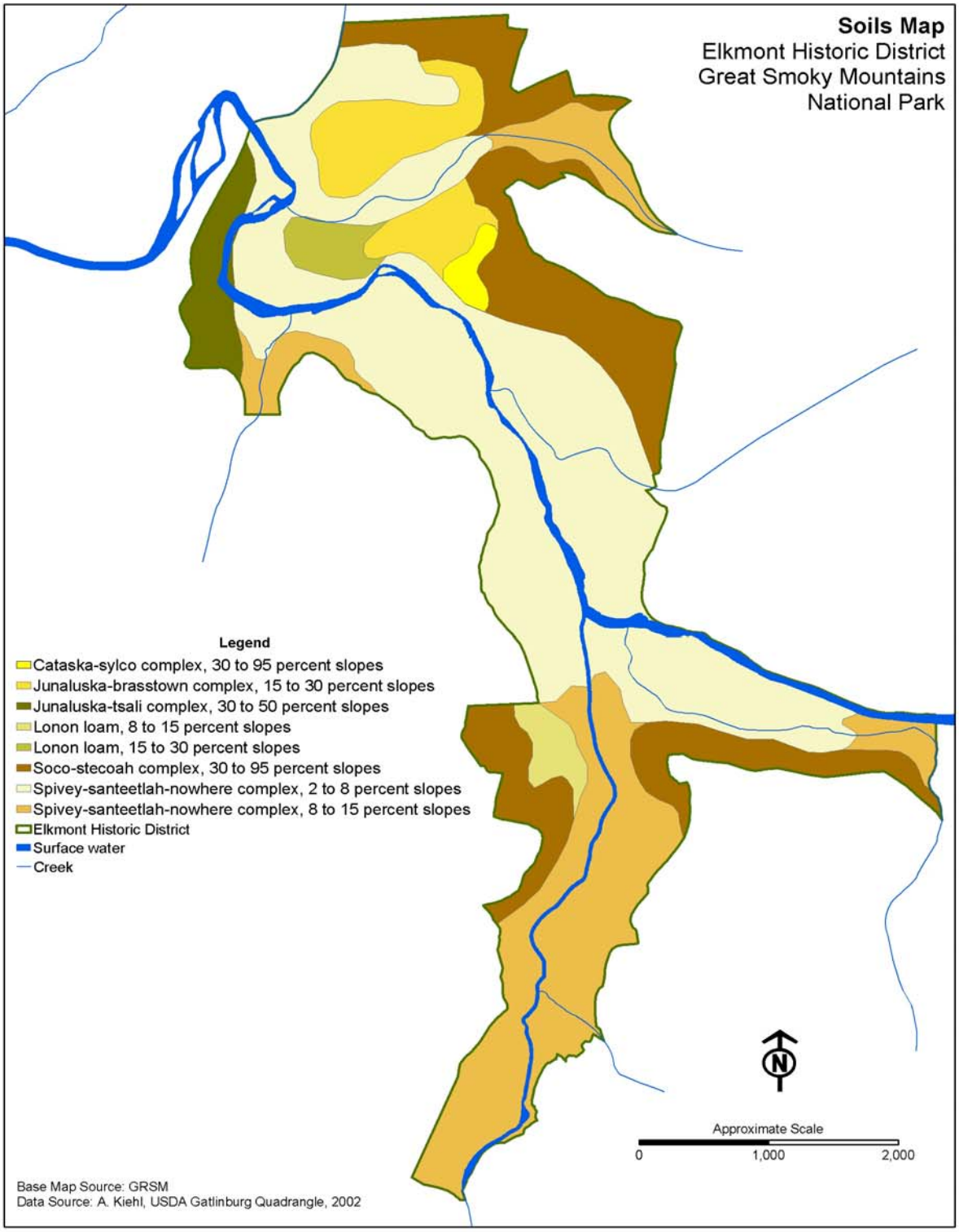
- A small portion of the Wonderland Hotel area consists of the Cataska- Sylco soil complex (CcF). This complex is in very rocky areas with steep slopes (50 to 95 percent slopes). This map unit is very steep and consists of shallow Cataska soils and moderately deep Sylco soils. They are generally found on steep slopes in low and intermediate mountains. Sylco soils are well drained and Cataska soils are excessively drained. These areas generally range from 4 to 32 hectares (10 to 80 acres) in size. Typically, this unit contains 40 to 50 percent Cataska soils, and 30

to 40 percent Sylco soils. These soils are too intricately mixed and small in size to separate them in mapping.

These soils have moderately rapid permeability, with slow runoff where the leaf litter has not been significantly disturbed and rapid runoff in areas lacking leaf litter. Weathered bedrock is found at 25 to 51 cmbs (10 to 20 inches) in Cataska soils and 51 to 102 cmbs (20 to 40 inches) in Sylco soils. Sylco soils have a wide range of organic matter content in the surface layer (low to high), while Cataska soils range from low to moderate organic matter content. These soils are underlain by sulfuric rock that may be exposed by road building and produce acidic runoff and seepage when exposed to precipitation. This acidic fluid may eventually flow into streams nearby and result in water quality degradation. The rock is also susceptible to landslides during periods of rain.

Small areas of Junaluska, Soco, and Spivey soils are also included in this complex. Less than 35 percent of the subsoil in Junaluska and Soco soils is comprised of rock fragments. The subsoils of Junaluska soils also have a higher component of clay. The surface layer of Spivey soils is thicker and darker. Junaluska and Soco soils are found at the base of slopes, while Spivey soils are found along drainageways. Approximately 20 percent of the map unit is comprised of these soil inclusions. Soils similar to Cataska and Sylco soils are also included in this unit and have a composition with fewer rock fragments and or subsoils that are more reddish.

Figure 3- 2: Draft Soil Map of the Elkmont Vicinity (USDA–NRCS)



3.2.2 Biotic Communities of Elkmont Historic District

Great Smoky Mountains National Park is a richly diverse landscape, hosting approximately 1,600 species of flowering plants, over 50 native mammals, 200 species of birds, and a large variety of reptiles, amphibians, salamanders, invertebrates, insects and other biological organisms. Approximately 20% of the forest within the Park has old growth characteristics. Many other areas have been previously disturbed and are in a variety of stages of succession following disturbance from logging and agricultural practices that occurred prior to the Park's establishment (UNESCO 2003).

Vegetation communities differ with changes in elevation, slope and slope aspect. The combination of variable topography, presence of the Little River and tributaries, and past land uses have all contributed to development of a variety of vegetation communities throughout the District. These communities, in turn, provide habitat for a diverse population of aquatic and terrestrial organisms. Biotic communities of the District are discussed in detail below.

3.2.2.1 Aquatic Communities

Streams and other aquatic environments in the Park provide essential habitat for numerous species of invertebrates, reptiles and amphibians. Many reptiles and invertebrates, and all amphibians spend a portion of their life cycles in aquatic environments. Approximately 41 species of reptiles, including 24 snakes, nine lizards and eight turtles are known to occur in the Park. The Park also contains a great diversity of amphibians, including 31 species of salamander and 13 species of frogs and toads (Nichols Pers. comm. 2004). Fish and invertebrate species occurrences more specific to the Little River watershed are provided below.

Benthic Surveys

Tennessee contains six rivers classified as "Outstanding National Resource Waters". In addition, a portion of one river (Obed River) is classified as a Tier III provisional water. The Little River is classified as an Outstanding National Resource Water and was also chosen by the Tennessee Division of Water Pollution Control as a reference site in a program to help implement water quality standards. Benthic community research supports water quality data (See Section 3.2.4), indicating that the Little River contains water that is not degraded and has low levels of contaminants. Benthic invertebrate surveys are conducted annually on the Little River by Park personnel at a sample site located approximately three miles upstream from Elkmont, with access from the Little River Trail. Researchers follow protocols similar to the Rapid Bioassessment Protocols of North Carolina's Department of Environment/Water Quality. They assess species diversity and determine a Biotic Index score (ranging from poor to excellent) for each stream site. Since invertebrate species vary in their level of tolerance for chemicals and contaminants in water, species composition and richness tend to change as water quality declines. The biotic index takes into account both the number of species present and the level of tolerance the species show for pollutants. The highest value is assigned to species that are the most sensitive to pollution and the lowest is given to species that are found in polluted waters as well as clean aquatic ecosystems. Calculation for the biotic index utilizes both species abundance and the tolerance value, and then assigns an index value from poor to excellent based on a particular range. From 1993 to 2000, surveys found between 52 and 82 invertebrate species at the Little River sampling site, and biotic index scores ranged from good to excellent (Table 3- 4).

Table 3- 4: Little River Invertebrate Data

Year	Number of Species	Biotic Index Score
2000	63	Good
1999	64	Excellent
1998	52	Good
1997	72	Good
1996	No Data	N/A
1995	76	Excellent
1994	82	Excellent
1993	No Data	N/A

Source: NPS 2002b

Fish Surveys

The ongoing fishery management program at the Park was initiated in the mid- 1980s by the Fisheries Division of the Natural Resources Branch in the Division of Resource Management and Science. Overall program objectives are to assess fish communities and annual variation in both population density and biomass in large and small stream sites that best represent in- stream habitat. Sampling sites were selected to provide elevation profiles typical of montane streams in the Park, and data are generally collected on an annual basis. Specific program objectives include: (1) monitoring native brook trout distribution, (2) monitoring large stream fish communities and evaluation of angler use, (3) restoring populations of native brook trout in selected streams and (4) monitoring atmospheric and geological deposition throughout the Park. A total of four sampling sites are located within or near the District, including two sites on the Little River and two sites on Jakes Creek. One of the Little River sites is located just below the Elkmont Road junction with US 73 at elevation 603.5 m (1,980 ft); the other site is located upstream near the Little River truck road turnaround [elevation 701 m (2,300 ft)]. The two sites on Jakes Creek are located upstream from the cabins; the site further downstream begins at the pump house and ends 100 m (328 ft) below it [elevation 707.1 m (2,320 ft)]. The upstream site begins at the stream crossing on Meigs Mountain trail [elevation 755.9 m (2,480 ft)].

Data from three large streams in the Park are collected in a large stream monitoring study. Since 1986, fish population estimates have been conducted at sampling sites on Cataloochee Creek, Little River, and Abrams Creek. Abrams Creek had 18 species, which was the highest number of all the streams sampled. The Little River had the second highest number of species (12), followed by Cataloochee Creek, which supports seven species. Species diversity appears to increase in a downstream direction. Species diversity and composition of the three streams sampled are indicative of coldwater and coolwater ecosystems (Moore and Kulp 1994).

Some of the most common fish species found in the Little River include mottled sculpin (*Cottus bairdii*), longnose dace (*Rhinichthys cataractae*), northern hogsucker (*Hypentelium nigricans*), river chub (*Nocomis micropogon*), stone roller (*Campostoma anomalum*), saffron shiner (*Notropis rubricroceus*), and the rainbow trout (*Oncorhynchus mykiss*), a species that is not native to Tennessee.

In general, fish in the Salmonidae Family (trout, whitefish and salmon) require cold, clean water habitat with pools and riffles. For many visiting the District, these fish are an important resource, providing recreational fishing opportunities. Comparing the three

streams, mean salmonid biomass was greatest in Cataloochee Creek [37.29 kilogram (kg)/ha] [82.2 pounds (lbs)/acre] followed by Little River (33.60 kg/ha) [74lbs/acre] and Abrams Creek (32.85 kg/ha) [72.4lbs/acre]. Mean salmonid density followed the same trend. Of the three large streams sampled, Abrams Creek supported 14 species of non-game fish, the Little River supported ten species, and Cataloochee Creek supported five. Non- game species comprise 50.3 percent of the biomass in the Little River. The major factors influencing these populations are droughts and floods. Major droughts occurred in 1987 through 1989 and 1999 through 2001, whereas a major flood [>1,000 cubic feet per second (cfs)] [>28.3 cubic meters per second (cms)] occurred in 1994.

3.2.2.2 Terrestrial Communities

The region that separates the Great Valley of Tennessee from North Carolina is the Unaka mountains, which lie on the western edge of the Blue Ridge physiographic province (Wofford 2002; Isely 1990). The majority of the province is located in Tennessee, with the remainder in North Carolina. This region includes the group of mountains called the Smoky Mountains that encompasses the District. Many plant species in this region tend to show a strong affinity to specific physiographic and are found less frequently in other provinces.

Descriptions of the vegetation communities within the District are based on several data sources. One source is the Community Element Global (CEGL) system developed by the Association for Biodiversity Information (ABI). ABI became NatureServe in 2001 and currently maintains databases to support the United States National Vegetation Classification System (USNVCS) and the plot data upon which it is based. The CEGL system assigns a unique identifier code to each vegetation association (community) in the central biodiversity database. The second source of vegetation data is the Center for Remote Sensing and Mapping Science (CRMS) and NatureServe. Aerial photo interpretation and field verification were used to develop maps and a database that describes the vegetation communities in the Park. The classification system is outlined in the draft report, *Vegetation Classification System for Mapping Great Smoky Mountains National Park* (CRMS and NatureServe 2003).

The resulting map of plant communities in the District is a combination of the CEGL system and the *Vegetation Classification System for Mapping Great Smoky Mountains National Park*. The hierarchy in the Terrestrial System includes seven levels, five coarser physiognomic levels and two finer floristic levels. Vegetation community types that have a common configuration and roughly defined environmental factors are combined in the same formation. Characteristics such as vegetation type (forest, woodland, shrubland), growth habit (annual or perennial), leaf characteristics (needle- leaved, evergreen, deciduous) and whether the vegetation was planted versus naturally occurring are used to distinguish these formations. Each formation consists of "alliances", which refers to a group of plant "associations". The association is defined as "a plant community of definite floristic composition, uniform habitat conditions, and uniform physiognomy." The areas delineated on Figure 3- 3 represent the floristic levels of association. Table 3- 5 lists the plant communities (common name) along with the name of the association.

The Global Conservation Status rank identified for each plant community listed in Table 3- 5 is based on factors such as current geographic extent, threats, number of distinct

Figure 3- 3: Plant Communities of the Elkmont Historic District

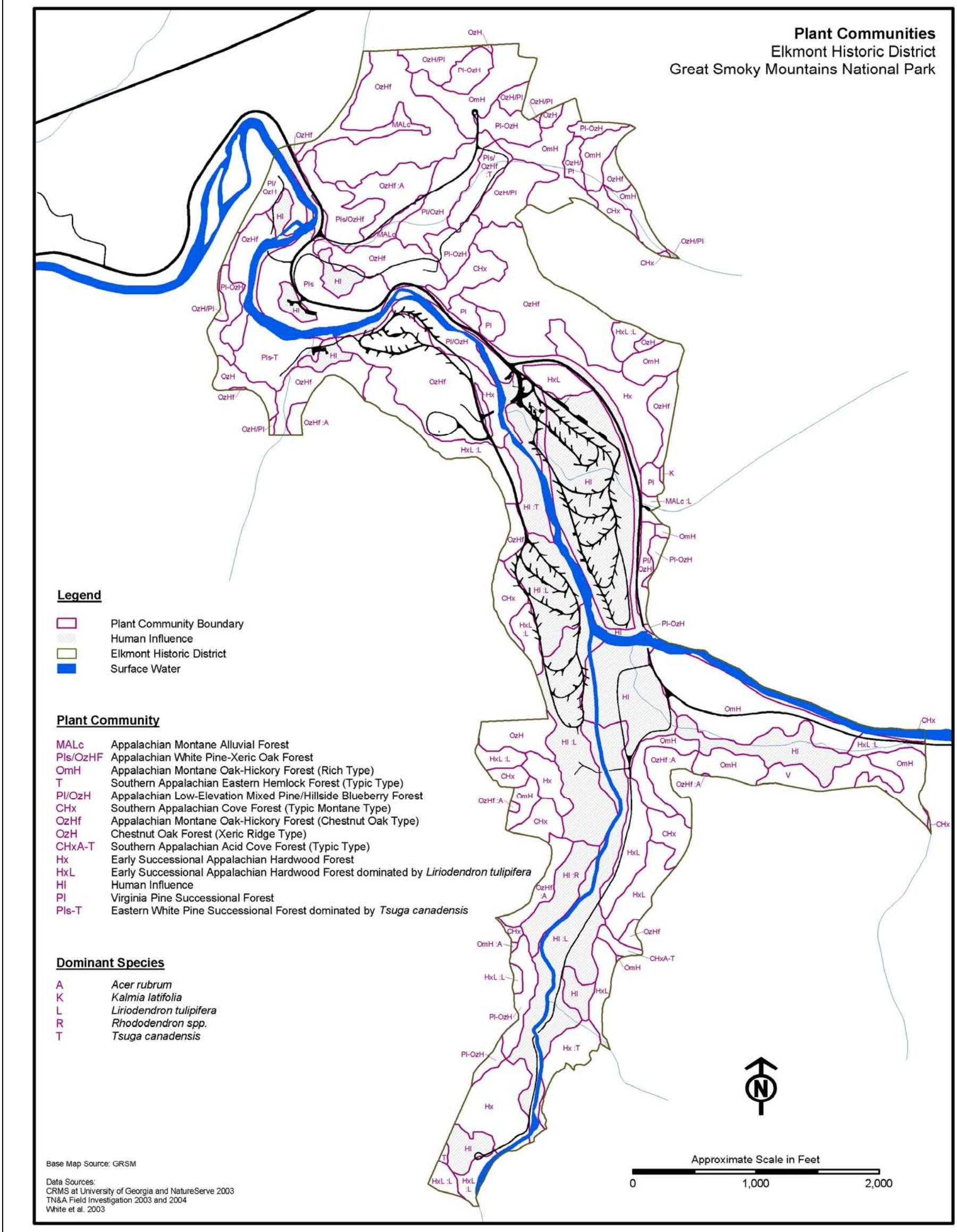


Table 3- 5: Vegetation Associations of the Elkmont Historic District

Map Key	Association	Community Name	Global Conservation Status Rank
MALc	*Platanus occidentalis – Liriodendron tulipifera – Betula (alleghaniensis, lenta) / Alnus serrulata – Leucothoe fontanesiana* Forest	Appalachian Montane Alluvial Forest	G2?
PIs/OzHf	*Pinus strobus – Quercus (coccinea, prinus) / (Gaylussacia ursina, Vaccinium stamineum)* Forest	Appalachian White Pine – Xeric Oak Forest	G3
OmH	*Quercus alba – Quercus rubra – Quercus prinus / Collinsonia canadensis – Podophyllum peltatum – Amphicarpaea bracteata* Forest	Appalachian Montane Oak- Hickory Forest (Rich Type)	G3
T	*Tsuga canadensis / Rhododendron maximum – (Clethra acuminata, Leucothoe fontanesiana)* Forest	Southern Appalachian Eastern Hemlock Forest (Typic Type)	G3 G4
PI/OzH	*Pinus virginiana – Pinus (rigida, echinata) – (Quercus prinus) / Vaccinium pallidum* Forest	Appalachian Low- Elevation Mixed Pine / Hillside Blueberry Forest	G4?
CHx	*Liriodendron tulipifera – Aesculus flava – (Fraxinus americana, Tilia americana var. heterophylla) / Cimicifuga racemosa –Laportea canadensis* Forest	Southern Appalachian Cove Forest (Typic Montane Type)	G4
OzHf	*Quercus prinus – (Quercus rubra) – Carya spp. / Oxydendrum arboreum – Cornus florida* Forest	Appalachian Montane Oak- Hickory Forest (Chestnut Oak Type)	G4 G5
OzH	*Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest	Chestnut Oak Forest (Xeric Ridge Type)	G5
CHxA- T	*Liriodendron tulipifera – Betula lenta – Tsuga canadensis / Rhododendron maximum* Forest	Southern Appalachian Acid Cove Forest (Typic Type)	G5
Hx	*Liriodendron tulipifera – Acer rubrum- Robinia pseudoacacia* Forest	Early Successional Appalachian Hardwood Forest	GD
HxL	*Liriodendron tulipifera – Acer rubrum- Robinia pseudoacacia* Forest dominated by *Liriodendron tulipifera*	Early Successional Appalachian Hardwood Forest dominated by Tulip poplar	GD
HI	Human Influence	Areas disturbed by human activities	N / A
PI	*Pinus virginiana* Successional Forest	Virginia Pine Successional Forest	GD
PIs- T	*Pinus strobus* Successional Forest dominated by *Tsuga canadensis*	Eastern White Pine Successional Forest dominated by Eastern hemlock	GD

Source: White et al. 2003.

G2=Imperiled: generally 6 to 20 occurrences and/or fewer remaining acres or very vulnerable to elimination throughout its range due to other factor(s)

G3=Vulnerable: generally 21- 100 occurrences. Either very rare and local throughout its range or found locally, even abundantly, within a restricted range or vulnerable to elimination throughout its range due to other factor(s)

G4= Apparently Secure: uncommon, but not rare (although it may be quite rare in parts of its range, especially at the periphery). Apparently not vulnerable in most of its range.

G5= Secure; common, widespread, and abundant (though it may be quite rare in parts of its range, especially at the periphery). Not vulnerable in most of its range.

GD= Ruderal: vegetation resulting from succession following anthropogenic disturbance of an area. Generally characterized by unnatural combinations of species (primarily native species, although often containing slight to substantial numbers and amounts of alien species as well).

? = a question mark added to a rank expresses an uncertainty about the rank in the range of 1 either way on the G1 to G5 scale.

G# G# = Greater uncertainty about a rank is expressed by indicating the full range of ranks which may be appropriate. For example, a G1 G3 rank indicates that the rank could be a G1, G2 or a G3.

occurrences, degree of decline from historic extent and degree or alteration of natural processes affecting the dynamics, composition, or function of the type (White et al. 2003). Characteristics of the District's plant communities are described below as provided in the *Vegetation Classification of Great Smoky Mountains National Park* (White et al. 2003). A description of the distribution of plant communities throughout each planning area of the District (Millionaire's Row, Wonderland Club, Daisy Town, Society Hill and the Elkmont Campground) is provided following the plant community descriptions. The distribution of these communities is shown on Figure 3- 3.

Globally Imperiled Associations (G2)

Appalachian Montane Alluvial Forest (MALc)

This association covers alluvial forests of Southern Blue Ridge mountains and nearby portions of the inner Piedmont. In the Park, it is associated with narrow, rocky floodplains and islands of medium to large streams, especially sections of streams that are flat or gently sloping. This community is naturally uncommon in the Southern Blue Ridge. Well- developed examples are rare due to past clearing for agriculture and development.

Floodplain forests in the southern Appalachians are among the most ecologically diverse plant communities in North America. Because of the high fertility and topographic protection of these sites, the tallest trees in eastern North America are found in this community type, with mature trees typically reaching heights of 165 ft or more. The tallest recorded tree in the Park and in the State of North Carolina is located in this forest community type and measured 234 feet prior to storm damage in 2004. Earliest historical accounts by European settlers and explorers describe the magnificence of montane alluvial forests.

Much of the ecological diversity and importance of montane alluvial forests extends from the unique structure, biota, and ecosystem processes created by their environment. Because they occur at the bottom of extremely steep, high gradient upland drainages, floodplains serve as a collection point for soil and other material deposited by water flow and gravity. The resulting deep soils are typically rich in nutrients and organic matter and may contain multiple buried soil horizons. In addition, flooding and deposition within the river floodplains results in a diverse patchwork of habitats. Within a mile stretch of montane alluvial forests, one may encounter rich areas of deposited soil and debris teaming with invertebrates and fungi, scoured areas that provide important habitat for rare species, and small depressional pools that are intermittently flooded and provide necessary habitat for breeding amphibians. The biological diversity of montane alluvial forest floodplains has received little study, but cursory work conducted as part of the Ravensford Land Exchange in North Carolina revealed a rich flora and fauna with dozens of undescribed species.

Impacts to montane alluvial forests represent a critical, negative impact both within and outside Park managed lands. The most recent vegetation mapping identifies 2,667 ha (6,590 acres) of this plant community type within the Park, approximately 1% of the Park's total area. However, the amount of this plant community found within the *floodplains* of large rivers and streams within the Park is a small fraction of this total. Steep upland drainages may have many of the same overstory species and may be

classified as the same community type, but they typically lack the biological and structural diversity of *floodplain* forests.

Montane alluvial forests are threatened by disturbances which cause changes in hydrology, and many of these sites were the first to be settled due to their flat terrain and access to waterways. Following establishment of the Park, floodplains continued to be used for roads, visitor centers, and Civilian Conservation Corps camps. In addition, a significant number of these floodplain forests (Hazel Creek, Eagle Creek, Abrams Creek, etc.) were lost with the creation of two reservoirs. In the District, the floodplain of the Little River was utilized as a site for the Elkmont Campground. Most of the structures in the Appalachian Club area are located on alluvial / colluvial flats and benches at the confluence of Little River and Jakes Creek.

Even more severe losses have occurred outside the Park where floodplain forests continue to be lost as a result of increasing and ever- intensifying land use. On private land, floodplains have been lost to development (including structures and roads), reservoirs, and agriculture. The few remaining privately held floodplain forests are typically highly fragmented and overrun with non- native plant species. In addition, there are no assurances that these areas will remain forested. Federal and state lands offer the best opportunities for their protection. However, within national and state forests, floodplain forests are managed for multiple uses. While best management practices (including 50- 100 ft buffers around streams) are used, timber harvests are often conducted in floodplain forests due to their accessibility and high productivity.

The continuing loss of floodplain forests has led to their classification as "rare" or "imperiled" by many organizations and agencies. Biologists from the *North Carolina Department of Environment and Natural Resources* and the *Tennessee Department of Environment and Conservation* have described the floodplain forests of Elkmont as rare and highly significant. Further, due to the linear nature of floodplain forests, restoration of this and similar sites was described as important to the long- term connectivity of adjacent upland forest communities.

The National Park Service has formally adopted the rating system developed by NatureServe as the definitive rating system for community vulnerability in the NPS *Interim Guidelines for Assessment of Impairment to Natural Resources*. NatureServe, the former science branch of The Nature Conservancy, has designated montane alluvial forests as globally imperiled (G2) since they are very vulnerable to elimination throughout their range as a result of human land use. By definition, communities with a G2 designation are "Imperiled: Generally 6- 20 occurrences and/or few remaining acres **or** very vulnerable to elimination throughout its range due to specific factors."

Over a period of several decades, The Nature Conservancy developed a national, hierarchical system of classifying vegetation. The classification is now actively managed by NatureServe. In consultation with state and federal agencies, NatureServe applies objective rarity ranking criteria to both species and vegetative communities. They have cooperative relationships with every state and their rarity ranks of species and communities serve as the accepted standard for federal land management agencies including the NPS. NatureServe scientists reviewed vegetation data from Elkmont and

have described its forests as rare and significant and stated that "…protection of a site with remnant alluvial forest and with the potential for recovery of natural hydrologic processes would be a significant contribution to the conservation of biological diversity…"

In addition, *Southern Forest Resource Assessment* (2002), a combined effort of the USDA Forest Service, US EPA, USFWS, and TVA, included floodplain forests as one of seven classes of critically endangered communities. This classification included floodplain forests with other biotic communities of documented rarity including spruce- fir forest, wetlands, long- leaf pine, and prairies. According to the assessment, most floodplains are in private ownership and their future depends upon the decisions of numerous ownerships with varying objectives that typically do not include conservation.

The montane alluvial forest community type represents a late successional forest community. Because of perpetual disturbance in the Elkmont environment for at least the past 100 years, including intensive lumbering operations, this plant community has been heavily impacted. If allowed the opportunity to succeed, many of the community types found within the Elkmont floodplain currently mapped as "human influence" (HI) will transition over time into plant communities with species composition more closely resembling that of the typical condition of montane alluvial forest.

Vulnerable Associations (G3)

Appalachian White Pine – Xeric Oak Forest (PIs/OzHf)

This association contains white pine (*Pinus strobus*), chestnut oak (*Quercus prinus*) and scarlet oak (*Q. coccinea*), as dominant species, occurring singly or in combination, each contributing between 25 and 75% of the total canopy coverage. In the Park, this forest type has a well- developed canopy and subcanopy. While it exists over a restricted range (based on suitable environmental conditions such as elevation, soil moisture, etc.), it is not threatened across this range.

Appalachian Montane Oak- Hickory Forest (Rich Type) (OmH)

This association includes forests dominated by white oak, occurring over circumneutral soils in the Southern Blue Ridge and adjacent inner Piedmont. In the Park and elsewhere where they are found, Appalachian montane oak- hickory forests can occur over a broad elevation range (2,000 to 4,500 feet), and can occur in exposed topographic settings (upper slopes), as well as on more protected sites (edges of coves). Upper Piedmont examples may be found below 1,000 feet. This forest type is naturally limited to richer sites in the Southern Blue Ridge Mountains and adjacent inner Piedmont. Later successional, unaltered occurrences are rare. Some stands have been impacted by removal of more valuable timber species (e.g. *Quercus alba* and other oak species) and the loss of herbaceous species diversity from the effects of logging.

Southern Appalachian Eastern Hemlock Forest (Typic Type) (T)

This community is found in forests of lower or protected slopes and terraces with eastern hemlock (*Tsuga canadensis),* occurring over a dense to patchy shrub stratum of rosebay rhododendron (*Rhododendron maximum*). In the Park, this forest is found in association with streams on low slopes with north- facing aspects. Most of the forests containing hemlock are in relatively inaccessible areas that can only be reached on foot.

Within the Park, eastern hemlock is a dominant or codominant species in seven vegetation associations and covers over 12,863 hectares (31,786 acres). In addition, it is a secondary component and common overstory or understory species in 16 other associations covering 6,132 hectares (15,152 acres). It is present as scattered inclusions in another 10,486 hectares (25,911 acres) (Welch et al. 2002). Hemlock stands sampled in 1994 averaged 213 years of age, with a maximum age of 435 years (Yost et al. 1994).

Eastern hemlock is a late successional species that is long- lived, with a life span of up to 800 years. It is exceptionally shade- tolerant, and is known to be capable of surviving in the forest understory for up to 350 years (NPS 2000a). The root system of Eastern hemlock is generally very shallow, making it vulnerable to mortality during drought periods. When present in stream and river corridors, the shade provided by hemlock trees moderates water temperatures. As a result, hemlocks in these instances are important for maintaining the habitats of cold water fish, such as brook trout. The dense foliage of hemlock forests also helps to protect watersheds by slowing spring runoff, and reducing the impact of heavy rainfall on soils by intercepting raindrops.

The occurrence of eastern hemlock forests has been significantly reduced from that of pre- European settlement (Burns and Honkala 1990; USDAFS 2004a). Recent data indicate that the decline of eastern hemlock forests may have a significant effect on riparian ecology. When streams draining hemlock forests were compared to similar streams draining hardwood forests, data indicated that aquatic invertebrate diversity was significantly higher in hemlock forests (USGS 2003a). This information highlights the potential importance of preservation and restoration of eastern hemlock forests that have been damaged or logged in the past.

Eastern hemlock forests provide habitat for a variety of mammals, birds, rodents and other organisms and hemlock trees are an important winter food source for a variety of wildlife. A total of 96 bird and 47 mammal species are currently known to be associated with hemlock forests in the Northeastern United States (NPS 2000a). Cottontail rabbits eat shoots and needles, while seeds and needles are eaten by ruffed grouse and red squirrels (Petrides 1998). Other wildlife associated with hemlock forests include black bear, bobcat, turkey and southern red- backed vole (Burns and Honkala 1990). Examples of birds include black- throated blue warbler, dark- eyed junco, blue- headed vireo, wood thrush, and ovenbird (Petrides 1998; Tennessee Ornithological Society 2002).

Eastern Hemlock Management Considerations

In the 1980s, a tiny, aphid- like insect, the hemlock woolly adelgid (*Adelges tsugae*), began threatening eastern hemlock forests. It was found to be infesting large forested areas, such as Shenandoah National Park (NPS 2002c). The first hemlock woolly adelgid occurrence at the Park was documented in May of 2002. Approximately 40 infested sites have been documented since then, but treatment began almost immediately. Three treatment methods, including two chemical and one biological method, have been implemented. The techniques employed on individual trees or those in developed, easily accessible areas, incorporate the use of either an insecticide or a soap solution, or a combination of the two. The insecticide is injected into the soil where it is taken up by the roots and eventually integrated into the leafy tissues of the tree. When the insects

feed on the sap of the tree, they also ingest the pesticide. For smaller trees, a soap solution is applied by spraying the infected areas of the tree, which kills the soft- bodied insects on contact. A third treatment using biological control has been initiated through the propagation and release of *Sasajiscymnus tsugae*, a non- native beetle that preys on the adelgids. This type of treatment is better suited for large, isolated areas that are not easily accessible. Elkmont is one of many areas in the Park that has received treatment for hemlock woolly adelgid (NPS 2003c). Treatment at the District has included both insecticide soil injections and foliar application of an insecticidal soap solution.

During the past 20 years, hemlock woolly adelgid has been held primarily responsible for significant declines detected in hemlock forests of the eastern United States. This trend has produced widespread concern among state and federal agencies that manage forested public lands. In response to an appeal from the NPS, US Geological Survey's Leetown Science Center, among others, has begun research to assess the potential long-term impacts of this negative development (USGS 2003a).

Apparently Secure Associations (G4)

Appalachian Low- Elevation Mixed Pine / Hillside Blueberry Forest (PI/OzH)

This community is found on low- elevation ridges and steep upper slopes dominated by Virginia pine. In the Park, it is found at elevations below 2,300 feet on gentle to moderately steep slopes and low ridges. Sites supporting this community are exposed, typically with southern and western aspects. This community is frequently fire-suppressed and affected by Southern pine beetle (*Dendroctonus frontalis*). As a result, it typically has standing dead trees, thick litter layers, and much understory encroachment by hardwood species.

Southern Appalachian Cove Forest (CHx)

This association represents deciduous forests of concave lower slopes and flats at middle elevations (2,000 to 4,500 feet) in the Southern Blue Ridge. In the Park, this forest is found in low, protected topographic positions, often near small streams, on gentle to moderate slopes with northerly aspects. Many of these sites were logged in the past, possibly because of their accessibility. Although it occupies sites with specific environmental conditions, this community is not rare. It is secure throughout its range, but susceptible to impacts by logging outside the Park due to its location in accessible topographic positions.

Appalachian Montane Oak- Hickory Forest (Chestnut Oak Type) (OzHf)

This community is known from low to intermediate elevations of the Southern Blue Ridge escarpment and Piedmont transition areas. It occurs on relatively exposed landforms below 3,000 feet elevation on moderately steep to steep, convex middle to upper slopes and ridges with mostly northern to southwestern aspects. In the Park, the elevation at which this forest community is found ranges from 1,650 to 2,600 feet. Appalachian montane oak- hickory forests range from "apparently secure" to "secure" over their range.

Secure Associations (G5)

Chestnut Oak Forest (Xeric Ridge Type) (OzH)

This community is found on xeric ridgetops in the Southern Blue Ridge, ranging south and east into the upper Piedmont and north into the Central Appalachians. It occurs over shallow, rocky soils, primarily on south- to west- facing slopes and ridgetops. In the Park, this community is found on middle to upper convex slopes and ridges with mostly southern and western aspects. It is found within the District and is widely distributed elsewhere in the Park.

Southern Appalachian Acid Cove Forest (CHxA- T)

This association includes hemlock- hardwood forests of lower to intermediate elevations in the Southern Blue Ridge and upper Piedmont, ranging from southwestern Virginia, south and west to northwestern Georgia. In the Park, this community is found on low slopes and flats, but also occurs on moderate to steep protected slopes. It is often associated with streams, but is not classified as a wetland. Southern Appalachian Acid Cove Forest is one of the most wide- ranging communities in the Park, occurring in most drainages from the 1,840 to 3,020 foot elevation range.

Ruderal Associations (GD)

Early Successional Appalachian Hardwood Forest (Hx)

This plant community occurs in areas that have been cleared and primarily revegetated from root and stump sprouts. Stands are dominated primarily by early succession species. Species vary throughout, but these forests are typical of areas which were once clearcut, old fields, graded for road construction, or cleared by fire or other natural disturbances. In the Park, these forests are found on low slopes and flats, typically below 3,000 feet elevation and particularly in areas of heavy settlement or past logging or farming activities. Although this forest type represents early succession vegetation, many disturbed montane alluvial forests at Elkmont are now included in this association, making them a conservation priority.

Virginia Pine Successional Forest (PI)

This community occurs in areas where canopy removal and intensive land use has created dry, open conditions and bare mineral soil, allowing for the establishment of Virginia Pine. These habitats include old fields, old pastures, clearcuts, and burned or eroded areas. Potential sites of this community in the Park include areas below 2,000 feet that have been subject to disturbance by humans over the past 50 years. Virginia Pine Successional Forest is an early successional community that is not of conservation concern.

Eastern White Pine Successional Forest (PIs- T)

This forest is an early successional forest dominated by white pine, typically with a very dense canopy and little understory. In the Park and elsewhere, it is commonly associated with anthropogenic disturbance and could potentially occur anywhere within the range of the *Pinus strobus* Forest Alliance. The woody and herbaceous species associated with this forest type vary with geography but are typically ruderal (species that become established in waste areas) or non- native species that favor openings or disturbance. This forest represents early successional vegetation and is not of conservation concern.

Other Designations

Human Influence (HI)

Areas classified as "HI" have been disturbed by human activities such as farming, logging, clearing for pasture, building construction and roads. Although the vegetation communities are in the early stages of succession, the secondary classification, such as "L", "T" or "R" indicates that plant species such as tulip tree, eastern hemlock and rhododendron, (respectively) are present as a secondary component in those areas which provides some indication of the community type that would develop if left undisturbed. Areas dominated by tulip tree could, over time, succeed into southern Appalachian acid cove forest or Appalachian montane alluvial forest (see p. 182- 184), while areas dominated by eastern hemlock or rhododendron may develop into southern Appalachian eastern hemlock forest.

Distribution of Vegetation Associations within the District

The influences of prior land uses and clearing for construction of roadways, buildings and the Elkmont Campground are evident in the condition of plant communities throughout the District. Many of these communities are described as "successional", indicating that they are in various stages of recovery from past disturbances. The current distribution of vegetation is a result not only of disturbances such as logging and development, but is also influenced by slope, elevation, soil types and the interactions between plants and wildlife that affect whether or not a particular plant will survive in one area or colonize another area. The distribution of plant communities found in each area of the District is discussed in more detail below. Based upon its landscape position, proximity to the major river, and residual vegetation, the floodplain area that comprises Millionaire's Row was likely the best example of montane alluvial forest within the study area prior to settlement. Also based upon these conditions, this area offers the best likelihood of success for future restoration efforts. Despite intensive past land use, the contemporary condition of this area suggests that, in the absence of further large- scale human disturbance, it will continue to develop into mature montane alluvial forest. (Jenkins 2005)

Millionaire's Row

Millionaire's Row is a group of buildings located primarily between the Little River and Bearwallow Branch, with one building just south of Bearwallow Branch. The dominant vegetation association in this area is Appalachian Montane Oak- Hickory Forest. A portion of this community along Bearwallow Branch was significantly disturbed previously by road construction, stream relocation and by construction of the cabins. Early Successional Appalachian Hardwood Forest dominated by tulip poplar (*Liriodendron tulipifera)* and Southern Appalachian Cove Forests communities are present in this area as well. The canopy in Millionaire's Row is dominated by tulip poplar, pine and oak species, and eastern hemlock (*Tsuga canadensis*). The mid- level canopy is primarily flowering dogwood (*Cornus florida*), red maple (*Acer rubrum*) and eastern hemlock. Sassafras (*Sassafras albidum*) is the most common sapling and rosebay rhododendron is the most frequently occurring shrub in the shrub layer. The scattered large sycamore trees (*Platanus occidentalis*) in this area indicate the presence of montane alluvial forest prior to human disturbance (Jenkins Pers. comm. 2004).

Wonderland Club

The Wonderland Club is comprised of a group of buildings located primarily on a ridge between the Little River and Catron Branch. The vegetation association found in this area is primarily Appalachian Montane Oak- Hickory Forest. Portions of the area also contain Appalachian Low- Elevation Mixed Pine/ Hillside Blueberry Forest, Eastern White Pine Successional Forest and Virginia Pine Successional Forest. Successional forests in this area are indicative of the previous disturbance from construction of roadways, the Wonderland Hotel, Annex and adjacent cabins. Some slopes in this area include dense stands of rosebay rhododendron (*Rhododendron maximum*) undergrowth.

Campground

The campground is located within and adjacent to the floodplain of the Little River on the alluvial flats below and along the lower portion of Mids Branch. The primary classification of this area is Human Influence (HI), indicating that there has been and continues to be a strong human disturbance effect on the natural community in this area. The secondary classification of the campground area is Early Successional Appalachian Hardwood Forest dominated by tulip poplar. The understory is relatively sparse and the herbaceous layer is patchy due to development and high concentration of recreational visitors. The occurrence of scattered, large sycamore trees in the campground is suggestive that this area, like portions of the floodplain in Millionaire's Row, was montane alluvial forest prior to human disturbance (Jenkins Pers. comm. 2004).

Daisy Town and Society Hill

Daisy Town is located in the area between Jakes Creek and Bearwallow Branch, while Society Hill lies farther upstream along Jakes Creek and near Tulip Creek, a tributary to Jakes Creek. The structures in Daisy Town occupy much of the former forest and most of the vegetation in this area is classified as Human Influence, a classification indicative of the prior disturbance that occurred in the area due to logging, road construction, construction of buildings, and ongoing disturbance during the longstanding former occupation of buildings. The secondary classification of most of these two areas is Early Successional Appalachian Hardwood Forest. Lesser amounts of Appalachian Montane Oak- Hickory Forest (Rich Type), Southern Appalachian Cove Forest (Typic Montane Type), Chestnut Oak Forest (Xeric Ridge Type) and Virginia Pine Successional Forest are present as well.

3.2.2.3 Wetland Community Types

The National Wetlands Inventory (NWI) identifies a thin strip of wetland along the Little River. The NWI characterizes the wetland as riverine, upper perennial, unconsolidated bottom, sand, and permanently flooded. The riverine system includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or forming a connecting link between two bodies of standing water. The upper perennial system is characterized by a high gradient and fast water velocity. Unconsolidated bottom includes all wetlands and deepwater habitats with at least 25 percent cover of particles smaller than stones (less than 6 to 7 cm) and a vegetative cover less than 30 percent, while the sand designation indicates that unconsolidated particles smaller than stones are predominantly sand, although finer or coarser sediments

may be intermixed. Permanently flooded indicates that water covers the land surface throughout the year in all years.

Five additional wetlands associated with the tributaries and floodplain of the Little River that are not shown on the NWI were identified within the District as well. The five wetland community types were classified using *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

Little River Wetlands

Those wetland areas proximate to the Little River, and its tributaries are classified as riverine, upper perennial, unconsolidated bottom, cobble- gravel, and permanently flooded. The steep banks and undulating floodplain along much of the river limit wetlands to areas extending just above the normal bankfull channel. Due to the scouring effect of seasonal flooding, the wetland boundary along the bank is somewhat dynamic, with wetland vegetation becoming established in areas where sediment deposition occurs as flood water recedes. The streambed and immediate stream bank generally contain only sparse areas of vegetation, with some areas colonized by dense stands of twisted sedge (*Carex torta*). The majority of vegetation growing along the Little River is dominated by upland species including eastern hemlock, tulip tree, rhododendron, and birch species (*Betula* spp.).

Tributary Wetlands

The Elkmont Historic District contains six tributaries to the Little River including Bearwallow Branch, Catron Branch, Mids Branch, Slick Limb Branch, Pine Knot Branch and Jakes Creek. It also includes Tulip Creek, a tributary to Jakes Creek.

The wetland type most closely associated with the tributaries is riverine, lower perennial, unconsolidated bottom, sand, and permanently flooded. The floodplains of the Little River tributaries are more defined and contain palustrine wetlands comprised of three different wetland types. The first type is classified as emergent, persistent wetland, and is located in highly disturbed areas and is dominated by Japanese grass (*Microstegium vimineum*). The remainder of these emergent, persistent wetlands in less disturbed areas is dominated by sweet Joe- pye weed (*Eupatorium purpureum*), southern lady fern (*Athyrium felix- femina*), Cherokee sedge (*Carex cherokeensis*), smartweed (*Polygonum cespitosum*) and Christmas fern (*Polystichum acrostichoides*). The second wetland type is classified as shrub- scrub, broad- leaved deciduous wetland and is dominated by mountain laurel (*Kalmia latifolia*) and spicebush (*Lindera benzoin*) with rosebay rhododendron as a subordinate species. The third type is classified as forested, broad-leaved deciduous wetland, dominated by sycamore and red maple. The presence of sycamore in these wetlands is an indication that prior to disturbance, these areas may have been occupied by montane alluvial forest.

Wetland Functions and Values

Wetlands provide a variety of potential values depending on their position in the landscape and proximity to other plant communities, wildlife and their habitats, and people. Wetlands were assessed during the field delineation and their functions and values categorized according to procedures described in the Highway Methodology Workbook supplement (U.S. Army Corps of Engineers 1999). This supplement is

accepted by the U.S. Army Corps of Engineers as an appropriate methodology to evaluate the inherent functions and values provided by wetlands to humans and the environment. Eight functions and five values were examined in the wetland investigation, including groundwater recharge/discharge; flood flow alteration; fish and shellfish habitat; sediment/toxicant retention; nutrient removal; production export; sediment/shoreline stabilization; wildlife habitat; recreation; educational/scientific values; uniqueness/heritage; visual quality /aesthetics; and endangered species habitat.

The principal functions and values of the wetlands within the Elkmont Historic District included fish and shellfish habitat; production export; wildlife habitat; recreation; and uniqueness/ heritage. The function of fish and shellfish habitat reflects the ability of the seasonal or permanent water body associated with the wetland to provide habitat for fish and shellfish. The function of production export considers the ability of the wetland to produce consumable or usable products for humans or other living organisms. The wildlife habitat function reflects the ability of the wetland to provide habitat for a variety of animal types and species that are often found in or near wetlands. The recreation value of a wetland considers both consumptive and non- consumptive types of activities and the ability of the wetland to provide opportunities for them. The uniqueness/heritage value reflects the ability of the wetland or its associated water bodies to supply special values.

Floodplain wetlands are considered important transition areas between riverine systems and the surrounding upland for a variety of reasons. They provide a unique environment for wetland plants to become established and subsequently provide habitat for a number of wetland- dependent species. Floodplain wetland vegetation aids in stabilizing soils and preventing erosion and scour during flood events. This vegetation also captures nutrients and sediments present in surface water runoff before they enter into surface water bodies. The floodplain associated with the section of the Little River that flows through the District is somewhat limited due to the prior construction of roadways adjacent to the river and retaining walls which prevent expansion of the floodplain. However, both the Little River floodplain wetlands and the tributary wetlands still have the ability to perform a variety of vital functions.

3.2.3 Threatened, Endangered, Rare and Sensitive Species

3.2.3.1 Federally- Listed Species

According to the Tennessee Department of Environment and Conservation Division of Natural Heritage, there are seven federally- listed species in Sevier County, which includes the District (Table 3- 6). None of these species are known to occur in the District or the surrounding Gatlinburg quadrangle. However, some of these federally-listed species could potentially occur within the District because of the presence of suitable habitat. This includes the Indiana bat (*Myotis sodalis*). Other federally- listed species that do not occur within the District because of lack of suitable habitat include spreading avens (*Geum radiatum*), spruce- fir moss spider (*Microhexura motivaga*), orange- footed pearly mussel (*Plethobasus cooperianus*), snail darter (*Percina tanasi*), and Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*). A brief description of the life history for those species that could potentially occur within Elkmont Historic District follows. A summary of all federally- listed species is provided in Table 3- 6.

Table 3- 6: Federally- Listed Species for the Elkmont Historic District Region

Scientific Name	Common Name	Habitat	Occurrence in Elkmont Historic District	Federal Status	State Status	Global Rank*
Plants						
Geum radiatum	spreading avens	Grows on thin, acidic soils and in cracks of cliffs with a northwest orientation at high elevations (over 1310 meters); at the bottom of rocky slopes and infrequently in openings in heath balds	Unlikely; habitat not suitable	Endangered	Endangered	G1
Insects						
Microhexura motivaga	spruce- fir moss spider	Coniferous forests at high elevations dominated by red spruce and Fraser fir; usually found in areas with damp moss mats on rocks and boulders that have a high level of canopy cover	Unlikely ; the District elevation is <2400 feet, habitat not suitable	Endangered	Unknown	G1
Mollusks						
Plethobasus cooperianus	orange-footed pearly mussel	Clean, fast- flowing rivers that are medium to large in size and have a muddy, rubble, gravel or sand substrate	Unlikely; Suitable habitat not present (large rivers with muddy substrate); no hydrologic connection to known populations	Endangered	Endangered	G1
Birds						
Haliaeetus leucocephalus	bald eagle	Mature riparian forest	Likely; foraging habitat present; known to occur in the Park	Threatened	D	G4
Fish						
Percina tanasi	snail darter	Shallow reaches of creeks and medium- sized rivers with good water quality and cool, medium to fast flowing waters with a gravelly substrate	Unlikely; no suitable habitat present (large, fast rivers)	Threatened	Threatened	G2G3
Mammals						
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	Habitat in the transition zone between coniferous (red spruce and Fraser fir) and northern hardwood (beech, yellow birch, maple, hemlock, red oak and buckeye) forests; mesic forests with large, widely spaced trees, a thick evergreen shrub layer and a high number of snags.	Unlikely; habitat is not suitable	Endangered	Endangered	G5T1
Myotis sodalis	Indiana bat	Hollow trees, loose tree bark and crevices in cliffs, bridges, buildings and towers for roosting; riparian forest for foraging	Likely; foraging, roosting and potential maternity habitat present; known to occur in the Park	Endangered	Endangered	G2

Sources: USDA FS 2002; NatureServe 2003; NHCP 2003; USDI FWS 1992, 1995, 2003; TDEC DNH 2003 * See Table Key on following page

Key for Table 3- 6:

Global rank:

G1 = extremely rare and critically imperiled, generally with five or fewer occurrences in the world, or very few remaining individuals, or because of some special condition the species is particularly vulnerable to extinction

G2 = very rare and imperiled, generally with six to twenty occurrences and less than 3000 individuals, or because of some factor (s), vulnerable to extinction

G3 = very rare and local throughout its range or found locally in a restricted range, or, because of other factors, vulnerable to extinction throughout its range; generally between 21 and 100 occurrences and fewer than 10,000 individuals

G4 = apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery; viability of the species is of long- term concern

G5 = demonstrably secure globally, though it might be quite rare in parts of its range, especially at the periphery

T# = taxonomic subdivision (trinomial)

State Status:

D = Deemed in need of management. Applies to any species or subspecies of non- game wildlife which the executive director of the Tennessee Wildlife Resources Agency believes should be investigated, in order to develop information relating to populations distribution, habitat needs, limiting factors, and other biological and ecological data and to determine management measures necessary for their continued ability to sustain themselves successfully. This category is analogous to "Special Concern".

Bald Eagle (*Haliaeetus leucocephalus*)
The bald eagle is a large bird of prey that is federally listed as threatened in the lower 48 states, though not federally protected in Alaska or Canada. It was downlisted from endangered to threatened in 1995. This brown bird is up to 90 cm (3 ft) tall, has a wingspan of approximately two meters (6 ft), and acquires white feathers on its tail and head that give it a "bald" appearance as it matures (baldeagleinfo.com 2003). It preys mainly on fish, but will also take waterfowl, small mammals and carrion, depending on availability. Nests are built in large trees and sometimes on cliffs or rock outcrops in secluded areas. A typical nest is two to three meters (6 to 10 ft) wide and at least one meter (3 ft) deep. Nests are rarely built at a distance greater than three kilometers (2 miles) from water (USDI FWS 1995). The past decline of the population was attributed to environmental contamination from pesticides that resulted in accumulation of toxins in adult birds, leading to reproductive failure. Environmental contaminants such as pesticides, herbicides, lead (from lead shot) and mercury in the tissues of fish continue to pose threats to eagle populations (USDI FWS 1995). Additional threats are posed by loss and alteration of habitat due to road building, clear cutting, trail and boat launch construction, human disturbance, declining food supply and illegal shooting. Since the 1970s, the number of breeding bald eagles has doubled every six to seven years in the contiguous United States (NatureServe 2003). Bald eagles are known to occur in all of the lower 48 states, and in 1995, there was an estimated total of 3,014 occupied bald eagle territories. Twenty- seven counties in Tennessee, including Sevier County, have documented bald eagle occurrences. Although the Park has no record of nesting bald eagles, it contains an ample supply of preferred habitat. The Little River, which supplies high quality water and contains a diverse array of fish species, provides potential foraging habitat and large trees nearby present possible nesting sites in the District.

Indiana Bat (*Myotis sodalis*)
The Indiana bat is a small brown bat that can be difficult to distinguish from its relative, the little brown bat (*M. lucifugus*). It is approximately 9 cm (3.5 inches) long with dull, grayish brown fur on the dorsal side, lighter brown fur on the ventral side and a light colored nose (NCHP 2003). This bat lives in trees from spring to fall and hibernates in caves during winter. Limestone caves are the primary sites used as hibernacula, but occasionally, abandoned mines and other underground hollows are utilized (USDA FS 2002). Hibernation occurs from early October until late March and April when the bats roost in tightly huddled masses of 500 to 1,000 individuals (DLA 2003).

In summer, males continue to use caves for roosting, while females utilize hollow trees, loose tree bark and crevices in cliffs, bridges, buildings and towers for roosting and raising their young (DLA Inc. 2003; NCHP 2003). Groups of 25 to 100 females raise their young in clusters called colonies. A wide range of tree species are used, indicating that tree shape and condition are more important characteristics than the tree species in determining suitable maternity habitat (USDA FS 2002). Although breeding occurs in fall, sperm is stored in the uterus of the female throughout the hibernation period until spring when fertilization occurs. In June, females give birth to a single offspring (NCHP 2003). In summer, foraging habitat consists primarily of forests near streams, but the most consistent habitat characteristic appears to be a closed canopy. Recent studies have indicated that over 57 percent of the maternity colonies were found in forests with an 80 to 100 percent tree canopy and 30 percent were found in forests with an intermediate

canopy (30 to 80 percent cover). The diet of Indiana bats consists of flying insects, but varies according to prey species availability (NatureServe 2003).

Indiana bat populations are found primarily in the Midwest and eastern United States, with the largest portion of the United States population hibernating in Indiana, Kentucky and Missouri caves (NatureServe 2003). Since 1950, there has been a precipitous decline in its population nationwide, and in Tennessee, their current status is S1. This status indicates that the species is extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or imperiled due to some special condition where the species is especially vulnerable to extinction. The bat was originally documented in 1937 at Park headquarters near Gatlinburg, approximately 8 km (5 miles) from the District. Since then, surveys of the Blowhole Cave in Whiteoak Sink documented bat numbers from approximately 2,000 to 20,000. In 1992, a smaller colony of approximately 200 Indiana bats was found hibernating in Bull Cave (DLA Inc. 2003). Blowhole Cave and Bull Cave are both located in Blount County approximately 18 km (11 miles) west of Elkmont. Since Indiana bat colonies have been documented in the Park and the District contains riparian habitat suitable for foraging, it is likely that the bats would use this habitat for foraging and possibly for rearing young. The District contains some areas of closed canopy forests highly favored by Indiana bats for maternity colonies and areas with an intermediate canopy (30 to 80 percent cover) that could also provide suitable habitat for females to rear their young and for roosting.

Primary threats to the continued viability of Indiana bat populations are related to disturbance of hibernacula. Disturbance to bats can be direct and intentional, such as burning, stoning, shooting and clubbing. However, indirect, unintentional risks to the populations occur when hibernating bats are disturbed by noise from spelunkers, tour groups, recreational explorers and scientific researchers. Even though it does not cause immediate fatality, the physical activity initiated by this type of disturbance results in the depletion of energy stores provided by body fat that the bats need to survive winter hibernation. Consequently, bats may die before they emerge from hibernation and are able to replenish lost reserves of energy (NCHP 2003). Additional threats come from natural events such as flooding or ceiling collapses in caves, and from human related activities such as pesticide application, habitat degradation and tree removal (USDA FS 2002).

3.2.3.2 State Listed Species

There are 55 species in Sevier County that are listed by the state of Tennessee as endangered or threatened (TDEC DNH 2004). The state listed species include 45 plants, two birds, four fish, one reptile, two mammals and one mollusk. Five of these state listed species are also on the federal list of threatened and endangered species (spreading avens, snail darter, Indiana bat, northern flying squirrel, orange foot pimpleback) and were discussed previously in Section 3.2.3.1. Two of the state listed fish species [lake sturgeon (*Acipenser fulvescens*) and blue sucker *(Cycleptus elongates*)] are not discussed in this document because they do not exist in the District, nor do they have potential to become established in the District due to lack of suitable habitat.

While no species on the state or federal lists of rare species for Sevier County were observed in the District, several rare species that are known to occur in other Tennessee

counties were identified during the 2003 and 2004 field investigations. They include butternut trees (*Juglans cinerea*), a state threatened species not listed by the state for Sevier County, but known to occur in seven locations throughout the District, and Fraser's sedge (*Cymophyllus fraserianus*), a State Special Concern species observed in both Society Hill and Millionaire's Row.

State Listed Plant Species

Of the 45 state listed plant species in Sevier County, only 15 have potential habitat in the District and seven are known to occur in the Gatlinburg quadrangle, in which the District is located. Since plants have a limited capacity to colonize areas distant from the parent plant, only those within the Gatlinburg quadrangle are being considered. The eight species include running bittercress (*Cardamine flagellifera*), rough hawkweed (*Hieracium scabrum*), Fraser's yellow loosestrife (*Lysimachia fraseri*), broadleaf bunchflower (*Melanthium latifolium*), mountain fetterbush (*Pieris floribunda*), yellow nodding lady's tresses (*Spiranthes ochroleuca*), southern nodding trillium (*Trillium rugelii*) and chamomile grapefern (*Botrychium matricariifolium*).

Running Bittercress (*Cardamine flagellifera*)

Running bittercress is a state threatened species that occurs in six states and in only five Tennessee counties. It prefers habitat along mountain streambanks and has an S2 rank in the state (indicating it is very rare and imperiled, with six to 20 occurrences and less than 3,000 individuals, or because of some factor(s) that make it vulnerable to extirpation from Tennessee). It produces flowers in May and fruit in June. Primary threats to running bittercress are from disturbance of the forest herb layer, conversion of land, habitat fragmentation and forest management practices (NatureServe 2003). The nearest known occurrence to the District was documented in 1964, approximately 14 km (9 miles) from Elkmont, south of Pigeon Forge on a steep slope near the park entrance. Although the District has no record of running bittercress occurrence, it does contain potential habitat suitable for the species.

Rough Hawkweed (*Hieracium scabrum*)

Rough hawkweed is an herbaceous plant that produces yellow flowers clustered at the top of the stem. Ovate, hairy leaves are born on hairy stems that are sometimes slightly red. Flowering occurs from June to September. It is a state threatened species with an S2 rank and is found in forests, along the perimeter and in clearings (Nearctica.com, Inc. 2003). The nearest known occurrence is from a 1935 record, which located the plant at Elkmont in the sterile sandy soil of an old field at an elevation of 670 m (2,200 feet). Although rough hawkweed is currently not known to occur in Elkmont Historic District, suitable habitat for the species could still be found in the area.

Fraser's Yellow Loosestrife (*Lysimachia fraseri*)

Fraser's yellow loosestrife is a perennial herb that grows to approximately 0.8 to 1.2 meters (2.6 to 4 ft), produces showy flowers with five yellow petals and bears lanceolate leaves in a whorled arrangement. Flowering occurs from mid- June to July and fruit is produced from September to October (GDNR 1995). This species is listed as endangered by the state of Tennessee and is also a federal species of concern. It is found on gravel bars and shrub islands in streams and on sunny, rocky slopes and roadsides (GDNR 1995). Since Fraser's yellow loosestrife tends to favor disturbed ecosystems, succession

presents the greatest threat to populations; however, if the level of disturbance is too high, populations may not survive. Fire suppression and dam construction are the greatest threat to populations in more natural settings. A 1935 occurrence of Fraser's yellow loosestrife was described as being located "near Gatlinburg", but no habitat information was included and the species has not been observed in the Park since (NatureServe 2003). Fraser's yellow loosestrife has been known to occur in an area near Elkmont, and the District contains disturbed areas, roadside habitat and streams with rocky slopes favored by this species. Therefore, it is possible that Fraser's yellow loosestrife could be found in the District.

Broadleaf Bunchflower (*Melanthium latifolium*)
Broadleaf bunchflower is a perennial herb that produces white flowers, an underground bulb, and long, narrow leaves, and grows to a height of 0.5 to 1.6 m (1.6 to 5 ft) tall. It prefers habitat that occurs on slopes and in ravines, gorges and coves with rich, moist, rocky, well drained soils. In general, it is found at elevations from 305 to 1,524 m (1,000 to 5,000 ft). In Tennessee, it is only known to occur in areas of high elevation (USDA FS 2004b). This species produces flowers from July to August and fruits from August to October. The broadleaf bunchflower is listed by the state of Tennessee as endangered and has been documented at four sites in the Gatlinburg quadrangle including Sugarland Mountain, at Huskey Gap Trail, on the Foothills Parkway in a small ravine between the two branches of Mill Creek, and on the west side of a ravine, west of Crooked Arm Ridge. The closest sites are at Sugarland Mountain and Huskey Gap Trail, approximately 3.2 to 6.4 km (2 to 4 miles) east of Elkmont. Since the District contains the rocky, well-drained soils and slopes favored by broadleaf bunchflower, it is possible that the species could be found in the area. In addition, since known occurrences are within several miles of the District new plants could potentially become established in the area if seeds are transported by wildlife or on the clothes or shoes of people moving from one area to the other.

Mountain Fetterbush (*Pieris floribunda*)
Mountain fetterbush is a state threatened species with a rank of S2. This erect, broadleaf, evergreen shrub grows to a height of 1 to 2 m (3 to 7 ft) and produces fragrant, white flowers easily visible above the dense foliage of the shrub. It generally occurs on balds at high elevations (USDA FS 2004c). Flowering occurs from May to June and fruit is produced from August to October. A 1956 occurrence was documented across from Park headquarters, approximately 8 km (5 miles) from Elkmont. However, the District does not contain the high elevation bald habitat favored by mountain fetterbush. Therefore, it is highly unlikely that the species would be found within the District.

Yellow Nodding Lady's Tresses (*Spiranthes ochroleuca*)
Yellow nodding lady's tresses is a state endangered species that prefers moist mountain woods habitat. Flowering occurs from September to October and fruits are produced during the same period. Only four counties in Tennessee have documented occurrences of this orchid. It has a state rank of SH, indicating it may be extirpated from Tennessee. It has been known to occur on hillsides in dry, sandy soil in the vicinity of Elkmont and at Fighting Creek Gap in the Park. The District includes areas of moist mountain woods habitat preferred by yellow nodding lady's tresses and the species has been documented as occurring approximately 1.6 km (1 mile) from the District at Fighting Creek Gap.

Therefore, a population of yellow nodding lady's tresses could potentially exist within the District or may become established in the future.

Southern Nodding Trillium (*Trillium rugelii*)
Southern nodding trillium is an herbaceous plant with large, white flowers. It can be distinguished from similar species by the pendulous quality of the flowers that hang below its leaves. Unlike the northern species, the pistil and stamens on southern nodding trillium are purple. It is found in rich, non- acid, open hardwood forests at an elevation of approximately 3,000 feet (Dudley 1998- 2002). It is listed as a state endangered species and has a flowering period that occurs between April and May, with fruit being produced from May to July. It has been known to occur at the Park in the vicinity of the Holston Assembly Grounds near Mynatt Park, approximately 5 miles (8 km) from the District. Although southern nodding trillium has been documented as occurring in the surrounding area, the District is located entirely at elevations of 2,400 feet or less. Therefore, Elkmont does not contain habitat suitable for southern nodding trillium, nor is the species likely to be found in the District.

Chamomile Grapefern *(Botrychium matricariifolium)*
Chamomile grapefern is a perennial herbaceous, non- flowering plant with thick leaves that grows to a height of 4 to 12 inches (10 to 30 cm). Its preferred habitat is moist, partially shaded, coniferous forests or slopes in deciduous forests (Williams 1990). Reproduction is by sporulation that occurs from June to August (TN DNH 2003). This fern is a state special concern species known to occur in only three counties in Tennessee, including Sevier County. It is considered critically imperiled in the state of Tennessee and has a global rank of G5, indicating it is secure globally (Natureserve 2005). Three populations have been documented in the Park, including one located near the Little River in the Millionaire's Row area of Elkmont Historic District.

State Listed Wildlife Species
Endangered and threatened plant species have limited mobility since their seeds must be transported by wind, wildlife or other carriers in order to colonize a new location. Consequently, in contrast to wildlife, they have a relatively limited potential to inhabit an area outside the quadrangle in which they occur. Wildlife have somewhat greater mobility and a greater likelihood to move from an area wider than the quadrangle that contains the District. Therefore, in addition to federal and state listed species that occur in the Gatlinburg quadrangle, Sevier County listed wildlife species are described below as well.

State listed wildlife species found in Sevier County that could find suitable habitat in the District include common raven (*Corvus corax*), peregrine falcon (*Falco peregrinus*), North American river otter (*Lontra canadensis*), longhead darter (*Percina macrocephala*) and northern pine snake (*Pituophis melanoleucus melanoleucus*). These species could potentially occur within the District and are discussed below.

Common Raven (*Corvus corax*)
The common raven is a large, black bird that is listed as a state threatened species with a rank of S2. This rank indicates the species is very rare and imperiled within the state, with six to twenty occurrences or few remaining individuals, or because of some

factor(s) making it vulnerable to extinction. The common raven is an omnivorous bird that eats carrion and insects such as maggots and beetles that feed on carrion. Other animal foods include small mammals, reptiles, frogs, young or wounded birds and some invertebrates. Plant foods consist of grains, acorns and cherries. This bird is active during the day and gregarious, sometimes roosting in large flocks. Breeding occurs in winter and eggs are laid in late February or early March. The female incubates three to six eggs, but after hatching, the young are cared for by both parents (UM 1995- 2003b).

The raven is found in a variety of habitats that include riparian lowlands to mountains, but it usually prefers areas that contain hills or mountains, especially those with steep rock faces. Vegetation varies from hardwoods and coniferous forests to more open grasslands and shrubby areas. Nests are built on rocky outcrops, in coniferous trees or on man- made structures such as bridges and billboards (NatureServe 2003). Major threats to this species are related to humans and include harassment, poisoning (due to ingestion of poisoned animal remains) and becoming caught in traps set for other animals (UM 1995- 2003b). The common raven has been known to occur in Sevier County, but not in the Gatlinburg quadrangle. It has been found in a wide range of habitats that include hardwood and coniferous forests that are found in the District and it has been documented as occurring in the county that contains Elkmont. Therefore, the District contains potential habitat that could support individuals or populations of common raven.

Peregrine Falcon *(Falco peregrinus)*
In Tennessee, the peregrine falcon is considered extremely rare and critically imperiled with five or fewer non- breeding occurrences or very few remaining individuals, or because of some special condition in which the species is particularly vulnerable to extinction (S1N rank). This bird of prey has pointed wings, a black cap, white throat, pale breast with brown bars and black vertical bands extending from the eyes down the neck. The feet are large and strong and the bill is hooked allowing it to carry and tear its prey into pieces (WDNR 2003). The peregrine falcon preys mainly on small to medium-sized birds that include a variety of songbirds and waterfowl, but it will sometimes eat small mammals, lizards, fish and insects (NatureServe 2003). In urban settings, it has been known to consume large number of pigeons and starlings, but tends to be an opportunistic hunter, taking whatever prey is available (WDNR 2003). Peregrine falcons occupy a wide range of habitats that include coniferous and hardwood forests, cliffs, deserts, shrublands, riparian wetlands, tidal flats, tundra and cities as long as there are suitable nesting ledges. Nests are usually constructed on cliff shelves or holes in steep rocky slopes. However, peregrine falcons may also nest on riverbanks, in open bogs, on large stick nests constructed by other bird species, in holes in trees and on man- made nesting platforms or structures (tall buildings, bridges, quarries) (NatureServe 2003).

Sexual maturity is reached at two or three years of age. Following breeding, the female lays three to five buff- colored eggs dotted with flecks of red- brown. After approximately 32 days of incubation, primarily by the female, hatching occurs. The young remain in the nest for 35 to 45 days and are fed by the female. After the young begin flying, the parents teach them to hunt for several weeks until they are able to capture prey on their own. The decline of peregrine falcon populations after the mid-1950s was attributed to extensive use of pesticides like DDT. Research linked the

pesticide to reduced estrogen and calcium levels, which resulted in thin- shelled eggs that were not strong enough to hold the weight of the incubating parent. Although DDT has been banned in the United States, it is still produced here and sold for use in countries where the birds spend the winter months (WDNR 2003). In addition to threats from persistent pesticides and other contaminants in the environment, habitat loss, shooting by hunters, and poaching of young in the nest are additional threats.

Thirteen Tennessee counties, including Sevier County, have records of peregrine falcon occurrences. There are two known occurrences of peregrine falcon in the Park, one at Greenbrier Pinnacle and the other at Alum Cave. The most recent siting was at Greenbrier Pinnacle, approximately 24 km (15 miles) from Elkmont. In April 2004, a pair of peregrines were observed displaying behaviors indicating that they were in the midst of egg incubation (NPS 2004g). Since the District does not contain the cliff habitat favored for nesting, it is unlikely that the species would rear their young in the area. However, the area includes a variety of bird species suitable as prey for the peregrine falcon. Therefore, it is possible that the peregrines nesting in the Park might use the District for hunting.

North American River Otter (*Lontra canadensis*)

The North American river otter is a state listed threatened species in Tennessee with a rank of S3, signifying that the species is rare and uncommon with 21 to 100 documented occurrences. This medium- sized mammal has a long, narrow body and short legs, a wide, flat head with a broad nose and small, rounded ears. The feet are webbed and the wide, tapered tail is used as a rudder when the otter is swimming. The fur is brownish, short and dense on most of the body except on the throat where it is grayish- white. Otters have distinctive facial whiskers that are highly sensitive to physical contact (DLA 2002).

River otters' prey consists primarily of slow moving or schooling non- game fish such as cyprinids, suckers (*Catostomus spp.*), chubs (*Semotilus sp.*), shiners (*Notropis spp.*), catfish (*Ictalurus spp.*) and perch (*Perca spp.*). They will also prey upon a variety of crustaceans, amphibians, insects, small birds and waterfowl, mammals and plants. The river otter is mainly active at night, but also in early morning and late afternoon (Hill 2001). It lives in a variety of aquatic habitats, including streams, lakes, ponds, swamps and marshes (DLA 2002). Young are raised in tree cavities, dense shrubs near rivers, undercut streambanks, tall marsh grasses and under tree roots or in dens excavated or constructed by other animals (Hill 2001). The North American river otter is widely distributed from Alaska and Canada throughout the United States, except in parts of the southwest. In the Park region, the species was historically common, but by the time the Park was established, river otters were rare in the Park due to unrestricted trapping. From 1986 to 1994, a reintroduction program was conducted that included release of approximately 137 individuals relocated from North Carolina, South Carolina and Louisiana. Historical records exist for an occurrence near Sugarlands Visitor Center, and since the reintroduction program was initiated, there have been sightings at Abrams Creek, Hazel Creek and at Elkmont (DLA 2002). Since the North American river otter has been sighted in the District fairly recently, and there is ample stream habitat available, it is likely that the species currently lives in or near the District.

Longhead Darter (*Percina macrocephala*)

The longhead darter is a threatened species in Tennessee with a rank of S2 (indicating it is very rare and imperiled with 6 to 20 known occurrences or few remaining individuals, or because of some factor(s) that make it vulnerable to extinction). It is also a federal species of concern. This small fish has a long, tapered head and a distinctive pattern of continuous black patches along the upper one half of the body, a black spot on the caudal fin and a mark below each eye. Habitat for the longhead darter consists of clean, medium- sized rivers with high velocity stream flow and riffles with a rocky substrate or pools with minimal turbidity (PA DCNR 2003). Life history and accurate population data are lacking due to difficulty in sampling with conventional methods. However, researchers believe spawning occurs from March to May and eggs have an incubation period of 27 days when water temperatures are at 10° Celsius. The eggs and larvae are vulnerable to predation since they are left to develop without any parental protection or rearing. For the young that survive, sexual maturity is attained in approximately two years. The population appears to be at risk primarily from various sources of sedimentation that reduce reproductive success, chemical contamination and dam construction (NatureServe 2003). The longhead darter is not known to occur in the Gatlinburg quadrangle, but it has been documented in Sevier County. The portion of the Little River that flows through the District is medium- sized with some of the characteristics preferred by this species. Therefore, although the longhead darter is not known to occur in the District, there is potential habitat for the species and it is possible that the longhead darter may occur there in the future.

Northern Pine Snake *(Pituophis melanoleucus melanoleucus)*

The northern pine snake is a large snake with a threatened species status in Tennessee and a rank of S3 (indicating it is rare and uncommon with 21 to 100 occurrences statewide). This snake, with wide dark bands, can reach a length of 2.5 m (approximately 8 ft) and has a range that includes northern Georgia and Alabama, most of South Carolina and parts of Tennessee, North Carolina, Mississippi, West Virginia, Virginia and New Jersey (CSI 2004). The snake is able to excavate tunnels and spends much of its time underground. It is thought to prefer large areas of upland habitat with some canopy cover, considerable ground cover and limited human disturbance. However, natural fire disturbance seems to be important for maintaining its habitat. It is a nonvenemous snake that preys on small mammals, rodents and birds by wrapping itself around the prey and causing suffocation. It lays eggs in underground nests that are usually located in open areas with sandy soils (NJDFW 2004). Major threats to the population are lack of fire, habitat fragmentation and land development (CSI 2004). Additional risks to the northern pine snake stem from human disturbance such as the use of off road vehicles and indiscriminate killing (NatureServe 2003). A historical record of occurrence was from Norton Creek near Gatlinburg, approximately 1.6 km (one mile) north of the Park boundary and 8 km (5 miles) from the District. A recent record of occurrence was at the NPS Headquarters office in Gatlinburg, approximately 11.2 km (7 miles) from the District (Nichols Pers. comm. 2004). Because this area is somewhat similar to Elkmont in topographical elevation, the pine snake would most likely occur in the sandy, dry ridges that surround the District.

3.2.3.3 Rare Species and Species of Concern

There are 18 Federal Species of Concern (FSC) listed by the U.S. Fish and Wildlife Service (USFWS) that are known to occur in Sevier County, Tennessee (USDI FWS 2004). The Tennessee Department of Environment and Conservation (TDEC) currently also has 36 plants, 13 mammals, six birds, one amphibian, three fishes and one mollusk on its list of rare species for Sevier County. Some of the species are found on both of these lists (Table 3- 7). While these species have no official federal status and are not protected under the provisions of the Endangered Species Act , both USFWS and TDEC request that agencies avoid impacting these species because they are rare and could eventually be elevated to state or federal listing as threatened or endangered if they continue to decline in numbers. Rare species and species of concern are listed in Table 3- 7 below along with their state status, habitat requirements, and potential for occurrence in the District.

3.2.3.4 Other Species Considered

Synchronous Fireflies

There are 14 species of fireflies in the Park. None of these species are federally or state listed; however, synchronous flashing is exhibited by one species (*Photinus carolinus)*. Large numbers of male fireflies gather in June and fly over the ground searching for a mate. As they fly, the group simultaneously emits flashes of light for six to eight seconds with breaks up to 10 seconds. Females may counter with a flash less intense from the ground (Omara- Otunnu 2003).

Photinus carolinus appears to occur at elevations of at least 2,000 feet in the Great Smoky Mountains and north into Pennsylvania (Milius 1999). The District contains some of the sites in the Park where *P. carolinus* has been observed. The grassy areas near creeks and rivers, and other open grassy areas at Elkmont provide suitable habitat that supports large numbers of the fireflies.

The firefly larvae are predaceous, with primary prey items that include earthworms, snails and slugs. They may also feed on dead invertebrates. Habitat for larvae consists of decaying woody or leafy organic matter along streambanks, pond shorelines and in open meadows. Adults prefer habitat similar to the larvae (Branham 1998).

Table 3- 7: Rare Species of Sevier County (Federal Species of Concern and State Special Concern Species)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
PLANTS						
Acer saccharum ssp leucoderme	Chalk maple	Not listed	Special concern	Circumneutral rocky woods	Yes	No
Acrobolbus ciliatus	Liverwort	Not listed	Special concern	Spruce fir forests and moist ravines on rocky substrate	No	No
Agrostis mertensii	Arctic bentgrass	Not listed	Special concern	Mountain balds and moist ravines	No	No
Anastrophyllum saxicola	Liverwort	Not listed	Special concern	High elevation rocky peat; heath and wet rocks	No	No
Botrychium matricariifolium	Chamomile grapefern	Not listed	Special concern	Mountain woods and thickets	Yes	Yes
Cacalia rugelia=Rugelia nudicaulis	Rugel's ragwort	FSC	Endangered	High elevation open woods	Yes	No
Calamagrostis cainii	Cain's reed grass	FSC	Endangered	High elevation rock outcrops and slide areas	No	No
Cardamine clematitis	Mountain bittercress	FSC	Threatened	In and along rocky streams	Yes	No
Cardamine rotundifolia	Roundleaf watercress	Not listed	Special concern	Wet soils, swamps, or flowing water	No	No
Cephaloziella spinicaulis	None	Not listed	Special concern	Crevices of rock outcrops	Yes	No
Clintonia borealis	Clinton's lily	Not listed	Special concern	High elevation mesic forests	No	No
Cymophyllus fraserianus	Fraser's sedge	Not listed	Special concern	Mixed mesophytic forests	Yes	Yes
Entodon concinnus	Lime entodon	Not listed	Special concern	Moist, calcareous rocks	No	No
Euonymus obovatus	Running strawberrybush	Not listed	Special concern	High elevation woods	Yes	No

Table 3-7: (continued)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
PLANTS (continued)						
Glyceria nubigena	Smoky Mountains manna grass	FSC	Threatened	Mountain balds and open seeps	No	No
Grimmia olneyi	Grimmia moss	Not listed	Special concern	Dry rocks and cliffs at high elevations	No	No
Hymenophyllum tayloriae	Gorge filmy fern	Not listed	Special concern	Gorges, waterfall spray zones, moist ceilings of cliff crevices and narrow stream gorges	No	No
Lejeunea blomquistii	Blomquist leafy liverwort	Not listed	Special concern	Mid- elevation gorges on rock or bark	Yes	No
Listera smallii	Appalachian twayblade	Not listed	Special concern	High elevation swamps or bogs	No	No
Lysimachia fraseri	Loosestrife	FSC	Endangered	Dry open woods	Yes	No
Megaceros aenigmaticus	Megaceros	Not listed	Special concern	Mid- elevation streams on wet, shaded rocks	Yes	No
Menziesia pilosa	Minniebush	Not listed	Special concern	Heath balds and cliffs	No	No
Mielichhoferia elongata	Moss	Not listed	Special concern	Woods above 5,000 feet	No	No
Milium effusum	Tall millet grass	Not listed	Special concern	Rich woods	Yes	No
Orthondontium pellucens	Translucent orthondontium	Not listed	Special concern	Soil peat or rock in heath balds	No	No
Panax quinquefolius	American ginseng	Not listed	Special concern	Rich woods	Yes	No
Plagiochila corniculata	Liverwort	Not listed	Special concern	Mature fraser fir and mountain ash bark	No	No
Plagiochila sharpii	Sharps leafy liverwort	Not listed	Special concern	Shaded, moist ledges and bluffs	Yes	No
Plantanthera psycodes	Small purple fringed orchid	Not listed	Special concern	Wet woods and bog margins	Yes	No

Table 3- 7: (continued)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
PLANTS (continued)						
Prunus virginiana	Choke cherry	Not listed	Special concern	Moist coves and slopes	Yes	No
Saxifraga caroliniana	Gray's saxifrage	FSC	Endangered	Rocky woods	Yes	No
Silene ovata	Mountain catchfly	FSC	Endangered	Rich woods	Yes	No
Streptopus roseus	Rosy twisted stalk	Not listed	Special concern	Wet cliffs and mountain woods	Yes	No
Tetradontium brownianum	Little Georgia	Not listed	Special concern	Montane rocky seeps and falls	Yes	No
Thelypteris phegopteris	Northern beechfern	Not listed	Special concern	Cliffs, ravines on shaded streambanks; in partial shade of rich, moist woodlands	Yes	No
Zanthoxylum americanum	Northern prickly ash	Not listed	Special concern	Moist woods and thickets	Yes	No
MAMMALS						
Condylura cristata	Star- nosed mole	Not listed	D	Low, wet ground near lakes or streams	Yes	No
Microtus chrotorrhinus carolinensis	Southern rock vole	Not listed	D	Cool, moist rocky woodlands	Yes	No
Myotis leibii	Small- footed bat	FSC	D	Hemlock forests, in caves and mines	Yes	No
Napaeozapus insignus	Woodland jumping mouse	Not listed	D	Forested or brushy areas near water, wet bogs, stream borders	Yes	No
Neotoma floridana haematoreia	Eastern woodrat	FSC	D	Talus slopes, rocky outcrops, bluffs, crevices and caves	Yes	No
Parascalops breweri	Hairy- tailed mole	Not listed	D	Sandy loam with good vegetative cover, not heavy, wet soils	Yes	No

Table 3- 7: (continued)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
MAMMALS (continued)						
Plecotus rafinesquii= Corynorhinus rafinesquii	Rafinesque's big- eared bat	FSC	D	Buildings, caves, trees with hollows and/or exfoliating bark	Yes	No
Sorex cinereus	Common shrew	Not listed	D	Moist areas in forests, open areas and brushlands	Yes	No
Sorex dispar	Long- tailed or rock shrew	Not listed	D	Cool, moist rocky areas in deciduous forests and mixed deciduous- coniferous forests	Yes	No
Sorex fumeus	Smoky shrew	Not listed	D	Hemlock forests with deep litter layer	Yes	No
Sorex longirostris	Southeastern shrew	Not listed	D	Open fields and woodlots; prefers moist areas	Yes	No
Sorex palustris punctulatus	Water shrew	FSC	D	Bogs or montane alluvial forests	Yes	No
Synaptomys cooperi	Southern bog lemming	Not listed	D	Low, damp bogs and meadows with heavy growth of vegetation	Yes	No
BIRDS						
Accipiter striatus	Sharp- shinned hawk	Not listed	D	Forest and open woodland, coniferous , deciduous or mixed forests	Yes	No
Contopus cooperi	Olive- sided flycatcher	Not listed	D	Forest and woodlands; coniferous, deciduous or mixed forests	Yes	No

Table 3- 7: (continued)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
BIRDS (continued)						
Haliaeetus leucocephalus	Bald eagle	Threatened	D	Forests and woodlands near medium to large rivers, lakes or other bodies ofwater	Yes	No
Lanius ludovicianus migrans	Migrant loggerhead shrike	FSC	Not listed	Open brushy areas, meadows, pastures, orchards and thickets along roads	Yes	No
Limnothlypis swainsonii	Swainson's warbler	Not listed	D	Forested wetland, coniferous, hardwood, or mixed forests; shrubland / chaparral	Yes	No
Sphyrapicus varius	Yellow- bellied sapsucker	Not listed	D	Riparian areas; coniferous, hardwood or mixed forests; suburban areas	Yes	No
Tyto alba	Common barn owl	Not listed	D	Herbaceous wetlands, cliffs, cropland, hedgerows, grasslands, savannah; suburban areas	No	No
AMPHIBIANS						
Cryptobranchus alleganiensis	Hellbender	FSC	D	Clear, fast flowing streams and rocky bottom rivers	Yes	Yes
Desmognathus wrightii	Pigmy salamander	Not listed	D	Spruce- fir forests; hardwood forests at lower elevations	Yes	No
Eurycea junaluska	Junaluska salamander	FSC	D	Rocky areas along streams	Yes	No

Table 3-7: (continued)

Scientific Name	Common Name	Federal Status	State Status	Habitat Requirements	Habitat Available in the District	Identified In or Near the District
FISH						
Carpiodes velifer	Highfin carpsucker	Not listed	D	Medium to large rivers and creeks, oxbows, sloughs, and ponds with sand or gravel substrate and medium to fast current	Yes	No
Cycleptus elongates	Blue sucker	FSC	Threatened	Swift flowing, large river habitats with high turbidity; sometimes in reservoirs	No	No
Etheostoma acuticeps	Sharphead darter	FSC	Not listed	Large fast flowing creeks with riffles and chutes; medium rivers with coarse gravel rubble or boulder substrate	Yes	No
Percina aurantiaca	Tangerine darter	Not listed	D	Creeks and small rivers with moderate to steep gradient; clear, moderately deep, rocky pools below riffles	Yes	No
Percina macrocephala	Longhead darter	FSC	Threatened	Fast riffles of clear, small to medium rivers	Yes	No
Phoxinus tennesseensis	Tennessee dace	Not listed	D	Spring- fed streams at ridge and valley limestone region	No	No
MOLLUSK						
Io fluvialis	Spiny riversnail	FSC	Not listed	Small streams or rivers with strong currents and limestone outcrops	No	No

Source: USFWS 2004; TDEC 2004; NatureServe 2004
Status: FSC = Federal Species of Concern; D= State of Tennessee vertebrate Species of Concern

3.2.4 Water Quality

The primary waterway traversing the District is a tributary of the Tennessee River known as the Little River. The NPS operates water quality monitoring stations along the Little River both upstream and downstream of the District. According to information provided by the NPS, no appreciable degradation of the water quality currently occurs between these monitoring locations.

The Little River flows in a northwest direction and has a channel length of approximately 36 km (22.4 mi) within Park boundaries. Gradients along the river range from 16 m/km (52.5 ft/mi) downstream from Elkmont to as much as 110 m/km (361 ft/mi) in the steep headwater tributaries. The main channel is perennial, with mean monthly discharges that range from 3.5 m^3/ s (123.6 ft^3/s) during base- flow conditions in September to 14.8 m^3/s (522.6 ft3/s) at high flow in March. From 1964 to 1995, average annual runoff from the basin was 93 cm (36.6 in) (Mast and Turk 1999). TDEC monitors a site on the Little River that is characteristic of the middle reaches of the watershed. The width varies from 7.6 to 12 m (25 to 40 ft), and the maximum depth is 0.7 m (2.4 ft). The site has approximately 85 percent canopy- cover and a streambed substrate that consists primarily of boulders (60 percent), cobbles (30 percent), and gravels (10 percent). The river also has occasional pools that contain some bedrock, silt and organic debris.

One of the responsibilities of TDEC, Division of Water Pollution Control (WPC) is the formal adoption of water quality standards, including the approval of water quality criteria. In Tennessee, the criteria determine the level of water quality protection for each of the designated uses. Those uses include fish and aquatic life protection, recreational use, domestic water supply, industrial water supply, irrigation, wildlife and livestock watering, and navigation. The highest level of water quality protection is awarded to streams and lakes designated Outstanding National Resource Waters (ONRW). Streams are nominated for ONRW status because they:

1. have important habitat for ecologically significant populations [including rare, threatened and endangered (T&E) species];
2. offer specialized recreational opportunities;
3. have outstanding scenic or geologic values; and
4. have very high existing water quality.

Tennessee's Water Quality Control Act also contains an anti- degradation statement that protects existing uses of all surface waters as established under the Act. In 1997, four streams within the Park were nominated and subsequently selected as ONRW. They include the Little River (whose entire watershed is within Park boundaries), Abrams Creek, West Prong Little Pigeon River and Little Pigeon River. These streams are significant regionally as well. With assistance from the United States Environmental Protection Agency, WPC personnel are subdelineating ecoregions within the state and characterizing water quality at carefully selected reference streams as part of the Ecoregion Reference Stream Monitoring program (NPS 2002b). A sampling site on the Little River within the District was selected as a reference site as part of the program to aid in implementing water quality standards. Information from the stream will help establish clean water goals for other streams in the Blue Ridge Mountains ecoregion.

The Elkmont Historic District sampling site is located near the gate across Little River Road. Habitat assessments, physical measurements, and chemical and biological samples were collected beginning in 1996. Ten habitat parameters were evaluated including epifaunal substrate/available cover, embeddedness, velocity/depth regime, sediment deposition, channel flow status, channel alteration, riffle frequency, bank stability, vegetative protection, and riparian zone vegetative width. Each habitat parameter is given a numeric ranking from 0 to 20, with 20 being the highest level. While the top score possible is 200, the Little River sampling site scores ranged from 193 to 197. Some points were lost at this site because there is very little slow velocity/shallow depth habitat and occasional low flow on the stream (NPS 2002b).

Mast and Turk (1999) collected and analyzed 61 water- quality samples as part of the Hydrologic Benchmark Data Network (HBN) by the U.S. Geological Survey (USGS). The USGS gauging station is located on the Little River approximately 12 km (7.5 miles) downstream from Elkmont in Blount County. Fourteen HBN sampling sites are located in the watershed, one within the District boundary and one just upstream from the boundary. Table 3- 8 lists instantaneous discharge, median concentrations and ranges of major constituents in stream water collected at the gage, and volume- weighted mean (VWM) concentrations in wet- only deposition measured at the National Atmospheric Deposition Program (NADP) station near Elkmont campground.

Table 3- 8: Values of Physical Properties and Major Ion Concentrations from Little River, 1985–1995, and Wet Precipitation Collected at the Elkmont Station

Parameter	Stream Water						Precipitation VWM[a]
	Minimum	First quartile	Median	Third quartile	Maximum	n	
Discharge, instantaneous	1.0	2.8	5.1	8.5	20	57	Not reported
Specific conductance, field	9.6	14	17	20	61	56	Not reported
pH, field	6.4	6.8	6.9	7.2	7.7	56	4.5[b]
Calcium	48	65	75	87	190	59	4.5
Magnesium	23	30	34	38	70	59	1.4
Sodium	19	39	44	48	61	59	2.7
Potassium	7.7	13	13	15	26	59	0.9
Ammonium	<0.7	<0.7	<0.7	1.4	3.6	59	10
Alkalinity, laboratory	60	96	120	140	260	59	Not reported
Sulfate	25	35	42	58	130	59	34
Chloride	8.5	11	14	17	49	59	3.1
Nitrite plus nitrate	<3.6	9.7	11	14	31	56	15[c]
Silica	83	90	95	110	120	58	Not reported

[Concentrations in units of microequivalents per liter, discharge in cubic meters per second, specific conductance in microsiemens per centimeter at 25°C, pH in standard units, and silica in micromoles per liter; n, number of stream samples; VWM, volume- weighted mean; <, less than]

[a] Values are volume- weighted mean concentrations for 1980- 1994; [b] Laboratory pH; [c]Nitrate only

Atmospheric deposition of sulfate, nitrate and hydrogen in the Southern Blue Ridge Province is among the highest reported in the Eastern United States. Based on over 15 years of recorded data, the VWM pH of precipitation measured at the Elkmont NADP station was 4.5. The dominant cations in precipitation were hydrogen, which contributed 63 percent of the total cation charge, and ammonium, which contributed 20 percent. Sulfate and nitrate were the dominant anions, accounting for 65 and 29 percent, respectively, of the total anions (Mast and Turk 1999).

Water in the Little River is dilute and weakly buffered. The pH ranges from 6.4 to 7.7, with a median near neutral (6.9), unlike the precipitation, which tends to be acidic. The dominant stream water cations were calcium and sodium, and the dominant anion was alkalinity. The low concentrations of compounds derived from weathering, particularly alkalinity, are attributed to the weathering resistant sandstones and quartzite of the underlying Precambrian bedrock. The median chloride concentration in stream water (4 millequivalents / liter) is approximately four times higher than the VWM concentration of chloride in precipitation. The difference between average annual runoff and precipitation suggests that evapotranspiration accounts for about a twofold increase in the concentration of precipitation. This implies that as much as half of the stream- water chloride may be derived from sources other than precipitation.

Taking into account the cumulative effects of evapotranspiration and inputs of sulfate in dry deposition, these data suggest that a considerable portion of atmospherically deposited sulfate remains in the basin. Adsorption on clays and organic matter in the soil environment is the most likely means for retention of sulfate (Mast and Turk 1999). The stream contains lower concentrations of both nitrate and ammonium when compared to precipitation, indicating the Little River basin is also an important sink for nitrogen compounds. On the contrary, data from streams found at higher elevations in the Park show nitrate concentrations similar to those in precipitation. The retention of both sulfate and nitrate in the Little River Basin is likely a significant contributing factor in buffering stream water from the effects of acidic deposition (NPS 2002b) at low elevations in the Park.

In a comparative study, a separate sampling program was conducted at points upstream, within, and downstream of the District during a ten- year period from 1993 to 2003 when the NPS collected quarterly water quality samples. This information was collected from three (3) separate stations. The sampling site located the farthest downstream from the District is near Metcalf Bottoms, which lies approximately 10 miles downstream from the Elkmont station. A third sampling site is located upstream from the District near the Cucumber Gap Trail. A summary of the data collected from these stations is provided in Tables 3- 9 through 3- 11.

In stream waters downstream from Elkmont, neither chloride nor nitrate concentrations were elevated, evidence that the wastewater discharge from Elkmont does not affect water quality during periods of low visitor use in the Park. Stream water nitrate concentrations in the Park vary seasonally, with the highest concentrations in winter and spring and the lowest concentrations in autumn. The uptake of nitrogen by microorganisms may play a major role in reducing nitrogen concentrations during the early stages of leaf fall (NPS 2002b).

Table 3- 9: Little River Water Quality at Metcalf Bottoms

	Units	Min.	Average	Median	Maximum	# of Samples
Hydrogen	µeq/L	0.08	0.32	0.30	0.89	46
Conductivity	µs/cm	11.45	15.45	15.47	21.00	44
PH	none	6.14	6.55	6.52	7.10	46
Calcium by IC	µeq/L	24.22	86.75	87.30	124.02	38
Calcium by AA	µeq/L	0.00	59.97	67.75	82.09	9
Magnesium by IC	µeq/L	17.52	30.49	30.77	58.31	38
Magnesium by AA	µeq/L	20.49	26.07	26.58	29.63	9
Sodium	µeq/L	24.34	38.68	39.69	50.61	46
Potassium	µeq/L	4.58	12.36	12.33	19.10	46
Ammonium	µeq/L	0.00	0.28	0.00	7.76	46
Sulfate	µeq/L	25.68	34.55	33.63	63.22	46
Chloride	µeq/L	6.40	15.17	13.39	38.01	46
Nitrate	µeq/L	0.00	8.82	8.49	29.52	46

Source: McGill Associates 2004

Table 3- 10: Little River Water Quality at Elkmont Road and Little River Road

	Units	Min.	Average	Median	Maximum	# of Samples
Hydrogen	µeq/L	0.11	0.40	0.37	1.08	36
Conductivity	µs/cm	6.40	14.20	13.83	20.70	36
pH	none	5.97	6.45	6.44	6.95	36
Calcium by IC	µeq/L	23.75	71.56	73.04	142.96	24
Calcium by AA	µeq/L	23.70	57.00	60.05	70.15	13
Magnesium by IC	µeq/L	12.98	28.89	24.82	96.90	24
Magnesium by AA	µeq/L	7.74	22.41	24.20	25.93	13
Sodium	µeq/L	10.40	36.54	36.41	55.34	36
Potassium	µeq/L	3.19	12.39	11.24	19.81	36
Ammonium	µeq/L	0.00	2.02	0.00	47.00	36
Sulfate	µeq/L	11.62	31.72	32.44	41.92	36
Chloride	µeq/L	4.52	18.02	17.29	37.90	36
Nitrate	µeq/L	0.00	9.48	10.56	19.32	36

Source: McGill Associates 2004

Table 3- 11: Little River Water Quality at Cucumber Gap Trail

	Units	Min.	Average	Median	Maximum	# of Samples
Hydrogen	µeq/L	0.14	0.47	0.45	1.25	38
Conductivity	µs/cm	10.92	13.18	13.22	19.90	38
PH	none	5.90	6.36	6.35	6.85	38
Calcium by IC	µeq/L	20.75	60.73	52.90	102.89	24
Calcium by AA	µeq/L	37.75	52.51	50.45	74.00	15
Magnesium by IC	µeq/L	12.57	22.82	21.02	46.89	24
Magnesium by AA	µeq/L	19.42	21.69	21.40	23.65	15
Sodium	µeq/L	13.69	34.93	36.19	69.62	38
Potassium	µeq/L	4.77	11.31	10.59	19.46	38
Ammonium	µeq/L	0.00	1.06	0.00	19.21	38
Sulfate	µeq/L	27.36	32.84	32.47	45.36	38
Chloride	µeq/L	10.77	17.94	15.09	42.46	38
Nitrate	µeq/L	0.00	11.86	12.00	23.07	38

Source: McGill Associates 2004

Although most of the constituents sampled at the three locations show a slight increase from the highest sample point in the watershed at Cucumber Gap down to the lowest sample point at Metcalf Bottoms, it does not appear that the District has any significant impact on surface water quality. In fact, of the parameters listed above, most values for the Little River exceed standards established by the state of Tennessee for those parameters in drinking water by a large margin (TDEC DWPC 2004). Because the data shown in Tables 3- 9 to 3- 11 are fairly consistent between sampling locations, no appreciable degradation of the water quality in the Little River is apparent between the water quality monitoring locations. A reasonable conclusion can be drawn from this information that there is currently no measurable degradation of water quality occurring as a result of activities occurring in the District.

3.2.5 Floodplains

Floodplains have the potential to provide floodwater storage following heavy rain events and prevent damage by reducing the rate at which floodwaters are released. By allowing a more gradual release of storm water, the potential for damage due to erosion can be greatly reduced. In addition, floodplains provide short- term storage of flood waters, allowing suspended sediments to settle out. Vegetation within floodplains provides nutrient and sediment filtration while stabilizing soils and providing wildlife habitat for a variety of terrestrial and aquatic wildlife. The capacity of floodplains to provide protection depends on a number of factors relating to the hydrology of the area. Some of those factors include the location of the floodplain relative to its watershed, whether flood storage is provided upslope of the floodplain, whether the watershed contains a high percentage of impervious surfaces, whether hydric soils are present, and the density of vegetation.

The District is traversed by two (2) primary waterways, the Little River, and its tributary, Jakes Creek. Other, smaller waterways in the District include Bearwallow Branch, Tulip Branch, Catron Branch, Mids Branch, Pine Knot Branch and Slick Limb Branch. The Little River drainage basin above the confluence of Jakes Creek consists of approximately 39 square miles of generally steep, rugged, forested terrain.

Research related to existing floodplain mapping in this area revealed that existing Flood Hazard Boundary Maps did not include coverage of the District area. While the existing Flood Insurance Rate Maps did provide coverage, the accuracy of this information was questionable. Therefore, to determine the maximum anticipated runoff from the 100- year storm event for the District, the United States Geological Survey National Flood Frequency, computer software (version 3.0) was used in conjunction with a topographic map, developed specifically for the District, and HEC- RAS engineering software (version 3.1.1) to ascertain the limits of the 100- year base flood. This method allows for demonstration of the approximate floodplain limits in a manner compatible with Federal Emergency Management Agency standards. The 100- year floodplain boundary is shown on the Existing Condition and Alternatives maps provided in Chapter 2 (Figures 2- 1 through 2- 8).

The results of this study indicate that the existing bridge structures over the Little River within the District are adequate to pass the volume of runoff created by the 100- year storm event. In addition, the bridge over Jakes Creek along the upper end of Jakes Creek

Road (above the Kuhlman cabin (40)) is also adequate to pass the designated storm event. However, the drainage culverts located along Bearwallow Branch (at Jakes Creek Road and Daisy Town Loop Road) are not adequate to pass the required volume of water during the 100- year storm event. As a result, storm water will be detained behind these structures and will overtop the roadways at these locations during a 100- year storm event. This study also indicates that the Miller cabin (46), Young cabin (48), Faust cabin (47) and garage, and minor portions of the lower levels to the rear of some of the Society Hill cabins along Jakes Creek lie within the 100- year floodplain.

None of the project alternatives under consideration contain facilities or improvements that encroach in the 100- year floodplain on or above the ground surface. There are subsurface water and wastewater lines that cross the floodplain area to reach cabins within Millionaire's Row and as subaqueous crossings of Jakes Creek. There are also water and wastewater lines crossing the Campground Bridge and the Jakes Creek Cemetery Bridge, but these lines would be attached to these bridges above the 100- year flood elevation. Because none of the encroachments described above impact the regulatory floodplain, revisions to the floodplain would not be necessary.

3.2.6 Air Quality

The Clean Air Act of 1970 established national policy for protection, preservation and enhancement of air quality. The 1977 Clean Air Act Amendments offered the highest level of air quality protection to National Parks with areas greater than 6,000 acres. These areas, including Great Smoky Mountains National Park, are designated Class I areas. Additional means of achieving this level of protection were provided in the 1990 Amendments to the Act. The Clean Air Act requires that federal land managers take responsibility for ensuring that air quality and air quality –related values in Class I areas are not degraded. Land managers are also required to actively protect, preserve and enhance the Park's resources (NPS 2004h). Over the past 24 years, air quality research and monitoring in the Park has indicated that emissions carried into the Park by wind and air currents have significantly impacted Park resources, visitor satisfaction and public health. The primary source of emissions is burning of fossil fuels such as coal, oil and gas that produce sulfur dioxide and nitrogen oxides. Those primary pollutants chemically react with other compounds in the environment to produce secondary pollutants that include sulfates, nitrates and ozone (NPS 2004h). The Park has one of the most comprehensive air quality monitoring programs in the National Park System. The current system includes nine weather stations, three atmospheric deposition sites, and seven air quality monitoring stations, one of which is located within the District. The following sections describe three parameters that are important indicators of air quality: visibility, ground- level ozone and acid precipitation.

Visibility

Visibility is recorded as the distance one can see in miles. Over that past 50 years, visibility in the Park has declined approximately 80 percent in summer and 40 percent in winter (NPS 2004h). Many pollutants contribute to reductions in visibility, but sulfur dioxide (SO_2) is the primary contaminant of concern. Chemical reactions of sulfur dioxide emissions from coal burning power plants with other atmospheric compounds produce miniscule sulfate particles. These particles scatter light and significantly contribute (83 percent) to reduced visibility (NPS 2004h). While average yearly visibility at the Park is 25 miles, it would be more than four times that distance (113 miles) without

the influence of human development. At times, visibility has dropped to less than one mile (NPS 2001b). In 1999, the Environmental Protection Agency (EPA) instituted the Regional Haze Rule that mandates a return to natural conditions for visibility on the haziest days by 2064 and preservation of the current high visibility days. In fall 2001 the Tennessee Valley Authority announced that controls for sulfur dioxide emissions would be installed on three power plants closest to the Park. These controls are anticipated to reduce sulfur dioxide emissions from those plants by more than 95 percent.

Ozone

Ground level ozone is another parameter that is often examined when analyzing air quality research. Ground level ozone is not the same as the protective ozone layer in the upper atmosphere that prevents the sun's harmful ultraviolet rays from reaching the earth. Ozone at ground level is produced during sunny conditions when nitrogen oxides combine with hydrocarbons (NPS 2001c).

Although there are several air pollutants for which there are national ambient air quality standards have been established in the United States, the quality of air in the Great Smoky Mountains National Park is largely reflective of ambient ozone levels. Ozone at the ground level has many direct impacts. In humans and animals, oxidants in ozone can cause eye, nose, and throat irritation. Chronic exposure to high ozone levels can result in loss of lung function. Ozone can also oxidize plant material and can, in conjunction with its associated pollutants, result in reduced visibility. Therefore, it is critical to minimize ozone concentrations whenever practical. While vehicles do not emit ozone directly, they do emit nitrogen oxides (NOx) and volatile organic compounds (VOCs) that react in the sunlight of the atmosphere to form ozone. Table 3- 12 presents some historical data on ozone levels in the Park.

Table 3- 12: Great Smoky Mountains National Park Ozone Concentrations (1997 to 2001)

Location	Largest 1- hour ozone concentrations, by year, ppb				
	1997	1998	1999	2000	2001
Look Rock, 1st Max.	117	135*	125*	111	96
2nd Max.	115	120	123*	108	93
3rd Max.	115	119	117	102	93
4th Max.	110	118	117	100	91
Cades Cove, 1st Max.	102	106	116	98	93
2nd Max.	99	101	102	97	88
3rd Max.	99	100	101	92	87
4th Max.	95	97	100	89	87

Source: McGill Associates 2004

*exceeds national ambient air quality standards

The national ambient air quality standard for ozone was a 1- hr concentration of 120 parts per billion (ppb). In past years, there have been violations of that standard within the Park. However, data indicates that ozone levels in the Park have been trending downwards in the recent past and no violations of ozone standards occurred during 2000 or 2001. This trend is consistent with efforts being made in Tennessee to reduce statewide NOx emissions. Indeed, the 1999 NOx emission inventory showed about 2022

tons per day (tpd) of NOx being emitted in Tennessee, while the 2007 emission inventory projection shows only 1439 tpd (McGill Associates 2004).

Ozone is a regional pollutant that is dependant on a large number of variables such as pre- cursor pollutant emissions (mainly NOx and VOCs). Ozone is also highly dependent on weather. The amount of sunshine, air temperature, cloud cover, humidity, and wind speed and direction can significantly affect ground level ozone concentrations (McGill Associates 2004).

When ozone reaches 85 to 104 ppb at ground level, it can adversely affect the health of people who are active outdoors, especially children and those with respiratory illnesses. Consequently, the EPA recommends that people in those populations limit their outdoor activity time when ozone reaches those levels (NPS 2002d). The data in Table 3- 12 indicate that ozone concentrations in the Park have consistently been above the level at which they are known to be harmful to humans. Harmful effects on people include coughing, sinus inflammation, chest pains, throat irritation, lung damage and compromised immune system (NPS 2001c). Studies have shown that even healthy people who exercise or otherwise physically exert themselves in areas with high ozone levels experience a reduction in lung capacity over the short term (NPS 2002d).

In addition to human health effects, adverse impacts to vegetation have also been documented. Field surveys have revealed that 90 species of plants show symptoms of damage like those due to ozone exposure. Controlled studies indicate that the levels of ozone in the Park are harmful to 30 species of plants. Generally, higher ozone levels and greater damage to leaves has been observed at higher elevations in the Park. In addition, reduced growth rates have been observed in specific plant species such as yellow- poplar and black cherry (*Prunus serotina*) (NPS 2001b).

Recently, the EPA revised air quality standard for ozone to provide increased protection for human health, lowering the compliance level from 0.12 ppm for a one- hour period to 0.08 ppm averaged over an eight- hour period. In response to a proposal from the Governors of Tennessee and North Carolina, the entire Park was designated non-attainment for the 8- hour ozone National Ambient Air Quality Standards on April 15, 2004. Consequently, steps must be taken to reduce emissions from both stationary and mobile sources in the non- attainment counties. Plans must be submitted by June of 2007 and attainment achieved by 2009 (NPS 2004h).

Acid Precipitation

The third parameter often examined when determining air quality is acid precipitation. The acidity of water is determined by the pH, a measure of hydrogen ion concentration. The pH is a log- base 10 scale from 0 to 14 in which a neutral solution, such as pure water, has a pH value of 7. Values lower than 7.0 are considered acidic, while those above 7.0 are alkaline (NCSU 2004). The pH of uncontaminated rainwater is 5.0 to 5.6 (slightly acidic). The pH of rainfall in the Park averages 4.5, approximately five to 10 times more acidic than normal rainwater. Clouds with pH levels as low as 2.0 have been documented in areas of high elevation forests in the Park (NPS 2001c). In addition to acid deposition from clouds and rainwater, these contaminants also derive from dry particulate matter. Acid deposition causes increased levels of nitrates in soils that can adversely impact vegetation and aquatic organisms. Most streams at high elevations in the Park have little

buffering capacity to neutralize acids formed from sulfur and nitrogen emissions. In addition, acid deposition has resulted in nitrogen saturation of soils, an effect that has been associated with the loss of calcium in Park soils. The reduction in this important nutrient can adversely impact vegetation and stream ecology. Acidic soils also cause the release of aluminum that can potentially harm vegetation by inhibiting nutrient absorption (NPS 2001b).

3.3 Interpretation and Visitor Use

3.3.1 Visitor Experience

If any one thing is conclusive about visitor use in the Park, it is that it will likely continue to increase, as it has historically since the Park opened in June 1934. The location of Elkmont within the Park's boundaries and ease of access to the area have ensured that it is one of the Park's more heavily used areas. Visitors to the Park have wide- ranging expectations for their experience at the Park and a number of factors shape the quality of that experience. While some factors are personal such as demographics (age, level of education, race or ethnicity and gender), personality, motivation and past experience, others relate to social or cultural variables.

The opportunities for diverse visitor experiences are determined largely by the variety, attractiveness and accessibility of the natural and cultural resources to visitors and the relationship of these resources to the Park's purpose and significance. Expectations for quality recreation experiences are different for various user groups, and they change over time. This raises contention between groups for whom quiet and solitude is a primary concern and other groups who desire enhanced facilities and organized programs. The quality of visitor experience can also be affected by the amount of available support facilities (such as parking lots, information centers or rest rooms), the extent to which these facilities are crowded, and the availability of necessary information. Those who participate in organized programs will naturally have more interactions with other visitors. Within the boundaries of Elkmont Historic District are a wide variety of recreational opportunities provided by the diversity of the land, area, and facilities. Primary uses by visitors to the District include:

- Camping
- Backcountry camping
- Day hiking
- Fishing
- Swimming
- Canoeing/kayaking
- Conducting research
- Driving and walking through the cabin area
- Birding
- Wildflower and wildlife viewing
- Ranger- led walks
- Campfire programs
- Photography
- Picnicking
- Fall leaf- change viewing
- Cross- country skiing

3.3.2 Visitor Facilities

Ample opportunities for both active and passive recreational activities exist within the District. Primary uses of the resources found within the District consist of trail use and access; camping; backcountry pursuits; water- based activities; educational programs and driving or walking through areas with historic buildings. The District includes a campground, a campground contact station, and several trails.

The campgrounds and trails provide very high- quality exposure to the natural and cultural resources of the Smoky Mountains and draw visitors to this portion of the Park. The District's cabins, Wonderland Hotel, and the Appalachian Clubhouse have the potential of providing very high quality exposure to resources as well. Although many of the trails are on the logging railroad grades and former roads, the surrounding forest continues to recover from prior human use impacts. Little River is one of the most scenic streams in the Park and has excellent trout fishing opportunities. The trail system at Elkmont provides access to high- elevation scenery for the hardiest of hikers. The easy grade of Little River Trail makes it a popular hike for novice overnight backpackers (Minnigh Pers. comm. 2002).

Elkmont Campground

The Little River provides opportunities for fishing, tubing, swimming and paddling activities and the campground can accommodate tents and recreational vehicles and trailers for overnight stays. Elkmont Campground is one of the most highly utilized sites for camping in the Park. In recent years, approximately 36 to 40 percent of the visitors staying in Park campgrounds used the Elkmont Campground. According to historical and recent data, 40 to 50 percent of the visitors enter the District primarily to access their campsite at the Elkmont Campground (NPS 2002a; 1987 to 1993; 2002 and 2003). Of more than $1 million generated by camping sales at the Park, Elkmont contributed approximately 44 percent.

The Elkmont Campground first opened shortly after the Park was established. It expanded in the 1950s, and, as part of the Mission 66 movement, was formally developed into the 1960s. Mission 66 was a ten- year construction program that was established in the mid- 1950s, and was aimed at improving overcrowding facilities in the National Parks by 1966, the fiftieth anniversary of the NPS. Mission 66 construction projects in the Great Smoky Mountains National Park included construction of campgrounds and park housing as well as road improvements and utility facilities (Brown 2000).

In 1964, the number of campsites at Elkmont was reduced from between 360 and 400 sites to 338 sites, each with a larger area. This change was implemented to improve the camping experience. Sometime after 1971, the sites were reduced from 338 to 240. In the 1990s, the number of sites was again reduced and today, there is a total of 220 campground sites. In more recent years, due to federal budget limitations, the camping season at Elkmont was reduced from year- round operation to the nine months from March to November (NPS 2002a). Even with these changes, visitation to the campground remains high. While the visitor use period was reduced by 25 percent, the campground still has an average annual visitation of between 90,000 and 100,000 people. According to data collected by the Park, overnight stays in the campground in the last several years totaled 93,918 in 2002 and 98,601 in 2003 (Tables 3- 13 and 3- 14; NPS 2002 and 2003). This is comparable to other data collected over the past several decades, as

reflected in Table 3- 13 below. In addition to the campground, visitors are also attracted to the area for backcountry access. Approximately 4,000 visitors entered the District in 2001 for access to backcountry camping sites (see Table 3- 16).

Table 3- 13: Visitation to the Elkmont Campground (1994 to 2003)

Year	Total Number of Visitors
1994	113,251
1995	109,158
1996	104,534
1997	117,562
1998	107,722
1999	107,620
2000	104,403
2001	98,242
2002	93,918
2003	98,601

Source: NPS 2002 and 2003

Table 3- 14: Elkmont Campground – Annual Visitor Use Breakdown (1987- 1993)

Activity	Total Number of Users by Year						
	1987	1988	1989	1990[1]	1991	1992[1]	1993
Overnight Visits							
Tents	59,835	73, 483	54,941	59,032	62,629	65,739	62,645
RVs/Trailers	57,276	70,508	55,548	55,374	55,708	55,876	39,294
Groups (except backcountry)	3,914	5,058	3,908	42,506	7,206	6,123	400[2]
TOTAL OVERNIGHT	121,025	149,049	114,397	156,912	125,543	127,738	102,339
Picnic							
No. Parties	524	812	226	353	81	- -	- -
No. Persons	327	2,077	653	883	10,113	- -	- -
TOTAL	851	2,889	879	1,236	10,194	- -	- -
Miscellaneous							
Hiking	23,747	14,766	1,702	4,036	3,731	4,133	4,434
Horseback Riding	216	156	26	65	62	94	107
Swimming	2,861	8,543	1,358	3,082	3,140	2,544	2,956
Fishing	2,057	4,142	1,276	2,157	1,399	1,752	1,889
Canoeing/ Kayaking	28	44	189	327	128	129	137
Tubing	846	3,346	2,716	2,687	2,272	1,846	1,380
TOTAL	29,755	30,997	7,267	12,354	10,732	10,498	10,903
TOTAL FOR YEAR	151,631	182,935	122,534	170,502	146,469	138,236	113,242

Source: NPS 2002a

[1] Metcalf Bottoms open, picnic area at Elkmont closed.

[2] Inconsistency in recordkeeping. Figure appears to be for 1- 2 month period only.

Trails

The trail system originating from Elkmont includes seven secondary and six tertiary trails that connect with other trails in the area and provide opportunities for beginning to more experienced hikers. Trails for visitors on horseback are also available. Some 60 miles of trails can be easily accessed from trailheads originating in the District. Due to the extensive trail system, use by both day and overnight hikers constitutes a significant proportion of all recreational uses for the area. Trailheads within the District include the Little River Trail (6.2 mi.) and Jakes Creek Trail (3.3 mi.). Between the Jakes Creek and Little River Trails, eight secondary and five tertiary connecting trails form loops to other trails within the region, providing a trail system with diverse terrain to satisfy novice and experienced hikers, as well as those on horseback. The Elkmont Nature Trail (0.8 mi.) is self- guided with no arterial trail connections.

The Little River Trail and its connecting trails constitute the most extensive system, covering approximately 38.8 of the 62.1 miles, or 62.4 percent of trail miles identified as originating within the District. Jakes Creek Trail and its related trails traverse another 22.5 miles, or 36.2 percent of all trail miles represented, while the Elkmont Nature Trail, at 0.8 mile, represents 1.3 percent of the total. Table 3- 15 identifies the primary trailheads and the extensive trail network originating within the District.

Table 3- 15: Trailheads and Connecting Trails Originating in Elkmont Historic District

Trail Name	Use Type	Length (miles)	Access Point
Little River	Hiking	6.2	Parking area near campground
Jakes Creek	Hiking, Horseback Riding	3.3	Parking area near campground
Curry Mountain	Hiking	3.3	Little River Road Trailhead and Meigs Mountain Trail
Cucumber Gap	Hiking	2.4	Little River and Jakes Creek Trails
Goshen Prong	Hiking	7.6	Little River Trail
Huskey Gap	Hiking	4.1	Little River Trail
Elkmont Nature	Hiking	0.8	Little River Road
Meigs Mountain	Hiking, Horseback Riding	6.1	Jakes Creek Trail
Miry Ridge	Hiking, Horseback Riding (in lower ½ only)	5.0	Jakes Creek Trail
Rough Creek	Hiking	2.8	Little River Trail
Sugarland Mountain	Hiking	11.9	Rough Creek and Huskey Gap Trails
Meigs Creek	Hiking	3.5	Meigs Mountain Trail
Panther Creek	Hiking, Horseback Riding	2.2	Jakes Creek Trail
Lynn Camp Prong	Hiking, Horseback Riding	3.7	Miry Ridge Trail
Middle Prong	Hiking, Horseback Riding	1.8	Panther Creek and Lynn Camp Prong Trails

Source: NPS 2002a

Seasonal trends in trail use are similar to those for use of other facilities in the Park, with the lowest numbers of people observed during the period from November to March and peak usage occurring primarily during the summer months from June to August.

Backcountry Pursuits

While it is unclear when the policy of requiring that permits be issued for all backcountry camping, it dates back to at least the early 1950s. By 1969, the Park had 18 backcountry shelters and maintained some 713 miles of trails (GRSM 1969). In 1972, a rationing system for camping along the Appalachian Trail and other popular trails within the Park was implemented. Rationing was instituted to address problems of large groups and proportions of visitors camping in and around shelters, creating substantial resource damage and crowding (Schlatter 1972; GRSM 1975).

The 1982 General Management Plan identifies some 478,184 acres (93 percent) of the Park lands as being within the "Natural Zone," which effectively constitutes the Park's backcountry area. In 1983, the first advanced reservation and first- come/first- serve requests for backcountry camping were introduced (Click 1983). By 1993, the number of backcountry sites had grown to 84 designated sites (51 open to horses, 15 rationed) and 18 shelters (13 open to horses, all rationed). For this same year, the Park reported 96,459 backcountry overnight stays, representing the sixth highest backcountry use within NPS (NPS 1993).

Table 3- 16 Backcountry Use Trends for Overnight Stays by Month (2001)

Month	Average Number of Permits*	Average Number of Users*	Total Camper- nights / Permits
January	14	37.2	83.1
February	33	87.6	195.8
March	73	193.8	433.2
April	49	130.1	290.8
May	92	244.3	546
June	101	268.2	599.3
July	55	146	326.4
August	43	114.2	255.2
September	50	132.8	296.8
October	79	209.7	468.7
November	29	77	172.1
December	27	71.7	160.2
2001 Totals	645	1,712.6	3,827.6

*Average of seven backcountry sites derived from self registration records from the Elkmont Campground.
Source: NPS 2002a

Today, there are 102 designated backcountry sites, eight of which are within the vicinity of the District. Four camping shelters (Derrick Knob, Silers Bald, Double Spring Gap, and Mount Collins) are accessible from the Jakes Creek and Little River Trailheads. Campers using these campsites register for overnight use by completing a camping permit at one of the 13 self- registration stations in the Park. The vast majority of the permits for these campsites are issued through the Sugarlands and Elkmont Campground permit stations (Minnigh 2002). While detailed records have not been kept for every backcountry site, records for sites 23 and 24 were found dating back to 1995 (Table 3- 17). Backcountry sites are accessed via the Goshen Prong and Little Creek Trails (Gray Pers. comm. 2002).

The system of trails within the vicinity of the District provides very high- quality exposure to the natural resources of the Smoky Mountains and is the main draw for

hikers to this portion of the Park. The trail system provides access to high elevation scenery for the hardiest hikers, while the easy grade of Little River Trail makes it a popular hike for novice overnight backpackers to reach the lower elevation backcountry campsites.

Table 3- 17: Backcountry User Trends for Sites 23 and 24 (1995 – 1999)

Year / Site		Annual Camper- nights (rationed)	Total Annual Camper- nights (rationed & unrationed)	Park- wide Total Annual Camper- nights	% of Park Total Camper- nights
1995	Site 23	1,002	1,433		
	Site 24	1,064	1,522		
Total for both sites		2,066	2,955	94,542	3.1%
1996	Site 23	1,128	1,613		
	Site 24	1,819	2,601		
Total for both sites		2,947	4,214	102,385	4.1%
1997	Site 23	1,155	1,652		
	Site 24	1,722	2,463		
Total for both sites		2,877	4,115	92,851	4.4%
1998	Site 23	1,246	1,782		
	Site 24	1,646	2,354		
Total for both sites		2,892	4,136	95,977	4.3%
1999	Site 23	1,203	1,720		
	Site 24	1,627	2,327		
Total for both sites		1,830	4,047	92,994	4.4%
Total (1995- 1999)		13,612	19,465	478,749	

Monthly use trends for overnight stays for 2001 are derived from the self –registration records submitted at Elkmont Campground. In the year 2000, an estimated 857 cars parked overnight at the two trailheads in the District for an average of two nights each. This estimate is based upon use figures for the seven backcountry campsites accessed from these two trailheads. Little River Trailhead receives 61 percent of this overnight parking use (Minnigh Pers. comm. 2002).

Water- based Activities

Since the Little River and its tributaries are central features in the District landscape, water- based activities attract a number of visitors. Fishing attracted visitors to the Smoky Mountains well before creation of the Park. The Little River is considered to have some of the best trout fishing in the region. Originally the native brook trout was present in most streams above 2,000 feet elevation. However, the effects competition with non- native species and from extensive logging operations in the early 1900s included loss of trout habitat in some locations and a subsequent reduction in the numbers of brook trout. Removal of trees overhanging the stream banks of water bodies throughout the area resulted in loss of shade and higher water temperatures than brook trout are capable of tolerating. Massive disturbance of vegetation and soils resulted in erosion of the denuded hillsides and subsequent sediment inflow into the streams. This damage to stream habitat resulted in elimination of brook trout from about 50 percent of its original range, leading to the stocking of both brook and brown trout. Brook, brown, and rainbow trout were introduced into Smoky Mountain streams by various groups, including logging companies, private citizens, and the state of Tennessee prior to Park establishment.

Both fly and spin anglers utilize the waters of the Little River near the roadside leading to Elkmont Campground and in other areas along the river. For the 7- year period between 1987 and 1993, the average annual number of people fishing within the District was 2,096

with a peak in 1988 of 4,142 (NPS 1987 to 1993). In addition to fishing, the waters that run through Elkmont Historic District provide for a number of other water- based activities. Table 3- 14 presents a general breakdown of visitor use within Elkmont. Based on averages taken for the seven- year sample period between 1987 and 1993, some 3,000 swimmers, 140 canoeists/kayakers, and more than 2,100 tubers participate in water-based activities from or within the District on an annual basis.

Educational Programs

The intent of the visitor use program is to enhance visitors' appreciation of the Park's natural, cultural and aesthetic values by providing opportunities for resource related activities (NPS 1982). Visitors to the Park have certain expectations of the types of experiences they desire and feel are acceptable in a National Park setting. The types of experiences available in the Park are centered primarily on appreciation of natural and cultural resources and species diversity.

Drafted in 1918 by the National Parks Educational Committee to encourage educational opportunities in National Parks, the following objectives are among the earliest expressions of NPS founders concerning Park management:

- to educate the public in respect to the nature and quality of the national parks;
- to further the view of the national parks as classrooms and museums of nature;
- to use existing publicity and educational systems so as to produce a wide result;
- to combine in one interest the sympathy and activity of schools, colleges, and citizen organizations in all parts of the country; and
- to study the history and science of each National Park and collect data for future use.

From the earliest days of the Park, its extensive and varied resources have served as the backdrop for research and learning. The Park provides a practical outdoor laboratory for scientists of multiple disciplines as well as classrooms for children experiencing the sensory pleasures, magnitude of the mountains and the rich diversity of the Park's natural communities for the first time.

In recognition of the need to educate the visiting public on significant resources within the Park, NPS developed a *Comprehensive Resource Education Plan* (CREP; NPS 2001a) that defined resource education themes and described a variety of programs offered through the Resource Education program. The intent of these programs is to provide opportunities for the public to learn about the history and existing condition of the Park. As described in the CREP Park Visitor Experience Statement, it is the intent of the Resource Education efforts to enable the general public to experience the following:

> By visiting Great Smoky Mountains National Park, visitors will realize that GRSM is part of the US National Park System and understand the reasons why this System was established. Visitors will become aware of the rules and regulations that govern the Park and have a safe and enjoyable visit by learning about the educational and recreational opportunities that exist there. Through resource education programs, Park visitors will gain knowledge of the resource issues facing the Park and gain an understanding of the Park's significance and resource education themes. Resource education programs and media will help

> Park visitors develop a sense of stewardship and protection for the Park's resources. This sense of stewardship will be translated into these visitors' everyday actions at home, including support for management actions affecting the Park (NPS 2001a).

While resource education and interpretation is one of many recreational user experiences within the District and Park- wide, it is perhaps one of the most important, and key to the overall objectives of the Park. Over time, the general understanding and expectations of what is broadly known as education has changed. This has impacted the nature and direction of programs offered through the years. A variety of programs have been offered at Elkmont and many of the earliest resource education efforts focused heavily on the natural elements of the Park. However, the Park has strived to balance the coverage of offerings between natural and cultural resources of the area.

By the 1980s, as one of the visitor concentration points in the Park, Elkmont Historic District offered an extensive spectrum of interpretive program events. Some of the "walks and talks" still offered bear names and follow routes developed 20 or more years ago. New programs have also been put into the traditional mix of ranger- led programs, including the "Nature's Palette" artist walk and "Remember This Special Place," an exploratory talk on individual meanings and feelings about the Smokies. Numerous diversified "walks and talks" and campfire programs are directed at teaching the public how to read the landscape, as well as interpretation of natural and cultural history.Interpretive program contacts, based on a five- month period in 1998, are shown below in Table 3- 18 with respect to programs offered at Elkmont during this period.

Table 3- 18: Interpretive Program Contacts at Elkmont (June to October 1998)

Ranger Interpretive Contact/Program	Number of Persons Per Month[1]					Total for 5- mo. Period
	June	July	Aug	Sept[2]	Oct[3]	
Elkmont Campground	932	1596	609	58	186	3381
Elkmont VIP Talks	6	- -	- -	3	- -	9
Elkmont Weekly Talks	87	418	367	83	326	1281
Elkmont Stream	12	17	8	- -	6	43
Elkmont Town	71	399	61	- -	26	557
Jakes Creek	- -	- -	9	- -	- -	9
Upper Little River	- -	6	13	- -	10	29
Elkmont Slick Limb	- -	8	10	- -	22	40
Elkmont Mids Branch	6	- -	8	- -	- -	14
Elkmont Bearwallow	11	14	18	15	16	74
Junior Ranger Program Elkmont	23	28	6	- -	- -	57
Monthly Totals	1,148.00	2,486.00	1,109.00	159.00	592.00	5,494.00

[1] Taken from raw data from Ranger roving contact reports, accuracy and completeness is dependent upon reports recovered for this period.
[2] Data for September 1998 is incomplete.
[3] Data for October 1998 is incomplete.

While this may not represent a complete picture of the array of interpretive programs and ranger contacts through such programs, it does offer a fairly detailed account of the range of "walks and talks" given during this time frame, as well as contacts made with Park visitors during roving reports. In addition to the typical "walks and talks", an

extensive publications program, and campfire programs, the Park has also undertaken other educational avenues including "Parks as Classrooms." This was a pilot program for a 5- year period (1991 to 1996) seeking to integrate the Park's natural and cultural values with interdisciplinary learning experiences, while meeting the state's curriculum requirements.

The "Parks as Classrooms" program underwent a comprehensive evaluation in late 1996 and is still in place to teach youth about the significance and interconnectedness of all things. The most recent programs and interpretive media offered by the Park include:

Evening Program Topics

- Bears of the Smokies
- Waterfalls of the Smokies
- Hiking in the Smokies
- History of a Mountain People
- The Civilian Conservation Corps
- Wildlife in the Smokies
- Off the Beaten Path
- Return of the Elk
- Move for a National Park
- Places and People of the Great Smokies
- Biodiversity in the Smokies
- History of Elkmont
- Great Smokies Overview
- The Double Life of Amphibians

Guided Hike Topics

- Reading the Landscape
- Old Elkmont Town Walk

Interpretive Media

Sales Items:

- *Last Train to Elkmont* (Weals)
- *Whistle Over the Mountain* (Schmidt and Hooks)
- *Logging in the Smokies* (Pierce)
- *Call Me Hillbilly* (Russel)
- *Woman of the Mountains* (Bush)
- *The Wild East* (Brown)
- *Great Smoky Mountains: From Natural Habitat to Park* (Pierce)
- *Strangers in High Places* (Frome)
- Little River Lumber Company and Railroad 2004 Calendar
- Logging History postcard strip
- Elkmont self guiding Nature Trail folder

Exhibits:

- Elkmont self- guiding Nature Trailhead wayside
- Signage at Wonderland Club and in Daisy Town

Ranger roves are routinely scheduled at Elkmont and through the campground to assist park visitors, answer questions, and discourage vandalism to structures during the summer months.

3.3.3 Visitor Use Data

The University of Idaho's Visitor Services Project conducted a Visitor Use Study at the Park in 1996. The report does not seek to draw conclusions about specific sites or areas of the Park and resource use within them; however several general conclusions can be drawn. The study indicates that 43 percent of summer visitors and 41 percent of all fall visitors to the Park accessed the Park through the Gatlinburg entrance (Littlejohn 1997). Given the proximity of the Elkmont area to the Gatlinburg entrance and Sugarlands Visitor Center, it is clear that a substantial number of visitors to the Park, particularly those staying for less than a full visitor day, could use trails and/or trailheads that originate in the District.

Since Great Smoky Mountains National Park opened in 1934, visitor use has increased and the trend will likely continue. During the first 20 years of the Park's establishment, visitation rose from 154,000 to 1,945,100, with annual increases from four to 95 percent. Data indicates only three years had a drop in total visits and two of those were during war time. During the 1950s and 1960s, visitation generally tended to increase, although not as dramatically. Annual increases during this period were between one and 31 percent, with most increases less than 10 percent. Again, only three years showed a decline in visitation and those declines were five percent or less. From 1971 to 1991, annual visits rose from 7,173,000 to 8,654,459, with annual increases up to 12 percent. Eight of these years showed declining numbers of visitors up to 14 percent, although most declines were less than six percent. The last ten years of the twentieth century showed similar visitation trends. Average annual increases were less than ten percent and three years showed declines of approximately one to seven percent. For the last ten years, average annual visitation to Great Smoky Mountains National Park has been between 9 and 10 million, higher than any other park in the country.

Table 3- 19: Visitation Projections for Elkmont Historic District (2002- 2015)

Year	Projected Visitation		
	Low	Moderate	High
2002	388,425	390,756	393,086
2003	390,756	394,279	397,803
2004	400,190	401,383	402,577
2005	404,992	406,200	407,408
2006	409,852	411,074	412,297
2007	414,770	416,007	417,244
2008	419,748	420,999	422,251
2009	424,785	426,051	427,318
2010	429,882	431,164	432,446
2011	435,041	436,338	437,635
2012	440,261	441,574	442,887
2013	445,544	446,873	448,202
2014	450,891	452,235	453,580
2015	456,301	457,662	459,023

Source: NPS 2004

The "Low" value assumes an average increase of 1.2 percent based on actual visitation history from 1991 to 2001. This number is represented in the "High" column. The "Moderate" value represents the average visitation based on the projected increase.

Visitation to Elkmont generally reflects the trend for increased visitation to the Park. During the first twenty years of the Park's establishment, annual visits to Elkmont rose

from approximately 21,000 to 105,424, an overall increase of 400 percent. During the 1950s and 1960s, visits to Elkmont continued to increase, although at a lower rate of approximately 150 percent. From 1971 to 1991, the trend continued, but visitation only increased a total of 31 percent. From 1991 to 2001, visitation again increased by a total rate of 12 percent.

Seasonal trends for camping and backcountry use indicate the lowest rates during the colder months from November to February during which time the Elkmont Campground is closed. The primary peak in usage occurs in June and two secondary peaks occur in March and October. Even though the campground is closed during the winter months, backcountry camping opportunities are still available and overall trends for visitor use in Elkmont are comparable to those for camping and backcountry use. During the past 30 years, the average number of annual visits attributed to District has been approximately 350,000. In 2001, annual visitation to the District was approximately 375,000. Projections for visitation to the District over the next 10 years range from a low of 400,190 in 2004 to a high of 459,023 in 2015 (Table 3- 19). In economic terms, the potential annual benefit from visitor recreation use is over $1 million. This is based on information gathered relating to the use of the District for the campground, hiking trails and access to backcountry areas (NPS 2002a).

3.4 Socioeconomic Environment

The potential labor force in Sevier County, defined as citizens over the age of 16, is 56,576. The majority (66.6 percent) are employed as civilians, while 0.1 percent serves in the Armed Forces. Approximately 33.4 percent of the working age population is not in the labor force and the unemployment rate is 4.3 percent. The top three occupations in the county are management, professional and related; service; and sales and office. Occupations that comprise less than 15 percent of the total include production, transportation and material moving; construction, extraction and maintenance; and farming, fishing and forestry. The top industry category, approximately 22 percent of the total, includes arts, entertainment, recreation, accommodation and food services. The next three largest industry groups are retail trade (15.8 percent); education, health and social services (11.9 percent); manufacturing (11.4 percent); and construction (10.8 percent). Most workers, 78 percent, earn private wages or salaries. Workers in local, state or federal government make up 11.3 percent of the workforce, while 10.3 percent of the wage earners are self- employed. The median income for individual, full- time female and male workers is $20,646 and $27,139, respectively (U.S. Census Bureau 2000a).

Considering the status of the Park as one of the nation's most popular parks, it is not surprising that the top industry category would include businesses that have close ties to tourism. Recreation, accommodation, and food service industries supply important service to Park visitors. Sevier County is one of the most popular vacation locations for people traveling within the United States. The greatest proportion of tourists comes from within Tennessee and neighboring Georgia and North Carolina. Guests of Sevier County stay an average of 3.9 nights, have an average of three people in a party, and often are returning for a repeat visit (74 percent). In 2003, the number of guest rooms available in Sevier County was 25,289 with hotel and motel rooms comprising 68 percent of the total. The market has indicated steady growth in cabin and condominium rentals as well (Lodging Resources, Inc. 2004).

One study concluded that 43 percent of summer visitors and 41 percent of fall visitors accessed the Park by way of the Gatlinburg entrance (NPS 2002a). Visitation to Gatlinburg mirrors the trend of visitation to the Park. Summer and fall are the seasons that receive the highest rates of visitation at 33 and 34 percent, respectively. Spring and winter are less popular seasons for people to travel to the area, with only 13 and 19 percent, respectively. Consequently, the demand for lodging during summer and fall is generally the highest. In nearby Pigeon Forge, from June to October, occupancy rates for lodging properties vary between 71 and 95 percent. From November to May the rates are much lower, ranging from 30 percent in January to 58 percent in May and October. Average daily rates for lodging range from $27 in January to $65.50 in July (Lodging Resources, Inc. 2004).

3.4.1 Population and Environment

Elkmont is located in Sevier County, Tennessee. Sevier County has an estimated population of 73,703, which represents an approximate increase of 39 percent from 1990 to 2000. The majority of the population is white, with minorities comprising the following portions of the population: black or African American: 0.6 percent; American Indian and Alaska Native: 0.3 percent; Asian: 0.6 percent; Hawaiian and other Pacific Islander: less than .05 percent; persons of Latino or Hispanic origin: 1.2 percent. The average number of people per household is 2.48 with a median household income of $34,719. In 1999, an estimated 10.7 percent of the population was living below the poverty level (U.S. Census Bureau 2000b).

The majority of the housing units in Sevier County have two or three bedrooms, with approximately 50 percent of the residents receiving their water supply through a public system or a private company and slightly less receiving their water from a private well. Sewage is most often (69 percent of the households) stored in septic tanks or cesspools for disposal, with approximately 28 percent serviced by a public sewer system. The primary source of heating fuel in Sevier County is electricity (65 percent) with an additional 16 percent of the households utilizing wood and ten percent utilizing fuel oil, kerosene, etc. as their principal heating source (U.S. Census Bureau 1990).

The two population centers closest to Elkmont are Gatlinburg and Pigeon Forge. These two towns are also gateway communities to the Park. In 2000, Gatlinburg had a population of 3,382 with a median age of 46.8 and the residents are primarily white (Area Connect 2000). Pigeon Forge has a population of 5,083 with a median age of 37.6. As in Gatlinburg, there are a small number of minority residents that comprise approximately five percent of the population (U.S. Census Bureau 2000c).

3.4.2 Land Use

The land surrounding the Park is primarily composed of forested mountains and hills. The small portion of neighboring land suitable for cultivation has been developed for agricultural use. Small towns and rural developments are sparsely spread across the region, but land use in some areas is rapidly changing as the population of the area continues to increase. A large part of land in the area is publicly owned and includes two National Parkways, three National Forests, a Cherokee Indian reservation and an assortment of water bodies developed by the Tennessee Valley Authority for flood control, recreation and power generation (NPS 1982a).

Sevier County contains 592 square miles of land with a population density of approximately 120 people per square mile (U.S. Census Bureau 2000b). Approximately one- third of the southern portion of the County is National Park land that is primarily forested and undeveloped. Within the Park, the 1982 General Management Plan designated management zones where specific strategies are employed to achieve a common set of goals. Guidelines outline which activities are appropriate for each zone and, within those zones exist subdivisions called subzones. Most of the area in the Park (91.2 percent) is designated Natural Environment with the majority in subzone Natural Environment - Type 1. Management in these areas emphasizes allowing natural processes to dominate the landscape. Active management is utilized only to aid in restoring the environment to a condition that would have existed had there not been human disturbance and invasion by nonnative plants and wildlife. Acceptable forms of development include trails, designated campsites, signs, trail bridges, pit toilets, and hitching rails. Visitor use is allowed in these areas as long as the activities promoted do not result in appreciable degradation of the resource. Compatible recreation includes hiking, fishing, horseback riding, swimming and backcountry camping (NPS 1982).

The second largest area in the Park is designated Development with three subzones: transportation (5.9 percent), general Park development (0.6 percent) and Park utilities (0.1 percent). This zone includes areas that enable visitors to experience the natural and cultural resource values for which the Park was created. Incorporated in this zone are roads that provide access, parking areas, interpretive displays and areas designated for camping and picnicking. Other acceptable forms of development in these areas are buildings, utility systems and storage areas needed for efficient operation and maintenance of the Park. Elkmont Historic District falls under the transportation and general Park development subzones, which have a total area of approximately 34,000 acres in the Park. The transportation subzone consists primarily of public roadway corridors. The general Park development subzone encompasses regions that include facilities for picnicking, camping, public and staff accommodations, historical and natural resource interpretation, parking, and park operation and maintenance (NPS 1982).

3.4.3 Access and Circulation

Elkmont is located in relative close proximity to large population centers, only a one to two- day drive for many people living in the eastern United States. Approximately 78 percent of Park visitors travel from areas east of the Mississippi with 40 percent originating in east north central states (Wisconsin, Illinois, Indiana, Michigan and Ohio), 24 percent from the south Atlantic states (from Maryland and West Virginia to Florida) and 14 percent from east south central states (Kentucky, Tennessee, Mississippi and Alabama) (NPS 1982). From the north, travelers can reach the Park from Interstate Route 75 or 81, from the east via the Blue Ridge Parkway or Interstate Route 40, from the west via Interstate Route 40 and from the south via U.S. Route 441 or Interstate Route 75. The Blue Ridge Parkway is a national parkway and primary scenic drive for the region, allowing drivers to reach the Park from Shenandoah National Park in Virginia. Additional transportation in the area is provided by bus lines and commercial airlines that serve the two closest large cities, Knoxville and Asheville, Tennessee (NPS 1982). A broad network of foot and horse trails provides visitors with non- motorized access to the area. One of those trails, the Appalachian Trail, is a 2,174 mile hiking trail that bisects the Park and has been designated a National Scenic Trail.

The District is approximately 3 miles (5 km) from the Park's northern boundary, making it easily accessible from Gatlinburg, one of the Park's gateway communities. Elkmont is also a short distance from Newfound Gap Road, which bisects the Park. This road leads from the Oconaluftee Visitor Center on the North Carolina side of the Park to the Sugarlands Visitor Center on the Tennessee side, near the Gatlinburg entrance to the Park. Data indicates that this road receives the heaviest traffic volumes of any road in the Park. However, the roadway that connects Pigeon Forge to Gatlinburg just outside of the Park boundary has even greater traffic levels (NPS 1982). Even visitors with limited time to spend in the area are able take advantage of the recreational opportunities at Elkmont due to the proximity to Sugarlands Visitor Center and the gateway communities of Gatlinburg, Pigeon Forge and Townsend.

Roadways in the Elkmont Area

The existing roadways that provide access to the District extend along Little River Road, from just south of the Sugarlands Visitor Information Center, Newfound Gap Road to the east and Little River Road to the west. Five sections of roadway and one (1) intersection provide primary access to the District and are:

- Newfound Gap Road from the Sugarlands Visitor Information Center to the intersection with Little River Road (1.8 miles)
- Little River Road from Newfound Gap Road to the intersection with Elkmont Road (4.8 miles)
- Little River Road from Elkmont Road to the intersection with Little Greenbrier Road (4.7 miles)
- Little Greenbrier Road from Little River Road to the intersection with US 321 (2.8 miles)
- Little River Road from Little Greenbrier Road to the intersection with Highway 73 (7.6 miles)
- Intersection of Little River Road and Elkmont Road (unsignalized)

Newfound Gap Road is a two- lane paved roadway with one travel lane in both the north and south directions. This road passes through the Park and connects Gatlinburg, Tennessee to Cherokee, North Carolina. The posted speed limit and general travel speed is 25 miles per hour (mph) within the vicinity of the District. Little River Road is a two- lane paved roadway with one travel lane in both the east and west directions.

Little Greenbrier Road is predominately a two- lane paved roadway with one travel lane in both the north and south directions. The roadway narrows to a single lane at a bridge crossing the Little River, approximately 500 feet (ft) from the intersection with Little River Road. Little Greenbrier Road and Highway 73 provide connections between US 321 and Little River Road.

Roadways Within Elkmont Historic District

The paved roads that access the District are in fair (minor cracking or potholes) to good (no potholes, shows signs of normal use) overall condition. However, narrow, one- way roads leading through the cabin areas are deteriorating and in need of repair and resurfacing.

The main road leading into Elkmont is NPS Route 18 (Elkmont Road) that extends from Little River Road to the Elkmont campground. Elkmont Road is a two- lane, paved road that is 1.47 miles long. The road has one 3,055- square- foot parking area. The road surface is in fair condition with occasional minor cracking and some minor surface depressions. Roadway drainage is good. This roadway has a paved bridge in good condition that crosses the Laurel Branch just west of the northern portion of the District.

NPS Route 233, Elkmont Campground Road, starts at the intersection of Elkmont Road and Little River Road at the park guard station. This circulatory roadway provides access to all the campground facilities within the District on both the eastern and western banks of the Little River. The campground loop is paved and is approximately 6.92 miles long. The road surface is in good condition with minimal cracking and good drainage. This roadway has a concrete bridge that spans the Little River.

NPS Route 133, Little River Road, starts at Elkmont Road and continues to the Little River Trail trailhead. This 1.64 mile long, two- lane roadway is partially paved. Approximately one- half (0.79 miles) of this road is unpaved. The road surface is in fair condition with occasional minor cracking and some minor surface depressions. Roadway drainage is good. This roadway crosses the Little River and is gated along Millionaire's Row.

NPS Route 134, Jakes Creek Road, provides access to the southern end of the District and connects to Little River Road in two spots. Jakes Creek Road is paved and is approximately 0.71 miles long. The roadway surface is in fair condition with occasional minor cracking and some minor surface depressions. Roadway drainage is good. This roadway crosses Jakes Creek at its southern end and includes two smaller crossings. One crossing is over Bearwallow Branch and the other is over Tulip Creek.

In addition to these functioning roadways, there is a roadway which is currently closed. This roadway branches off Elkmont Road near the Wonderland Hotel, continues to the northwest, and crosses the Little River with a wooden bridge (Bridge 76). This bridge is in poor condition and is currently closed to vehicular traffic. See Table 3- 20 for a summary description of the internal roads serving the District. Roadway locations are also depicted on the existing condition map of the District (Figure 2- 1).

Table 3- 20: Internal Roads Serving Elkmont Historic District

Route No.	Route Name	Route Description	Condition	Paved Miles	Unpaved Miles	Total Miles
018	Elkmont Road	From Little River Road to campground	Fair	1.47	0	1.47
133	Little River Road	From Route 018 (Elkmont Road) to trailhead	Fair	0.85	0.79	1.64
134	Jakes Creek Road	From Route 133 (Little River Road) to gate	Fair	0.71	0	0.71
233	Elkmont Campground	From Route 018 (Elkmont Road) to end of campground loop	Good	6.92	0	6.92

Other secondary roads provide access to a variety of destinations within the District. These secondary roads are discussed below.

- Wonderland Hotel and Adjoining Cabins
  The Wonderland Hotel area is accessed by a dirt/gravel roadway (Catron Branch Road) that winds around the hill at a moderate grade and terminates at the rear of the Hotel. This roadway continues on as a dirt road through the cabin area above the Hotel, eventually emerging on the Old Road to Gatlinburg, a gravel road that turns off Elkmont Road just before it reaches the Wonderland Hotel. This roadway is currently gated on each end and is only accessed occasionally by NPS service vehicles. This roadway through the cabin area and beyond is now little more than a dirt trail. It is very narrow for one- lane traffic and has a soft base. Consequently, it is washed out and rutted in many locations. At the northern end of this road, Catron Branch crosses through a corrugated metal culvert pipe that is now partially obstructed. Water currently flows around the culvert pipe and has washed away the roadbed at the crossing.

- Appalachian Clubhouse and Adjoining Cabins
  Jakes Creek Road, which passes through Daisy Town, is a narrow, one- lane asphalt road with broken pavement and potholes. This road is bordered on both sides by stone walls that run through most of the cabin area and ends at the Appalachian Clubhouse. While the road itself is sufficiently wide for one- way vehicular traffic, its narrow width and the restriction created by the stone walls make the road unsuitable for a combination of vehicles and pedestrians. However, with no exhibits in this area to generate pedestrian traffic and only limited vehicular traffic, this roadway has an acceptable capacity. Current traffic patterns require that all traffic in the Daisy Town and Society Hill areas, including the Jakes Creek trailhead, leave the area through the use of this one- way road.

- Society Hill
  Jakes Creek Road through Society Hill is a narrow, one- lane asphalt road with broken pavement and potholes. This road lacks the stone walls which are found in Daisy Town and has sufficient width to allow two cars to pass in opposite directions, but is not wide enough to safely allow two continuous lanes of traffic. The adjacent front yards of the cabins are sufficiently wide enough to accommodate pedestrian traffic at a safe distance from passing cars. Drainage from this roadway is good.

- Millionaire's Row
  An existing narrow roadway extends through Millionaire's Row, but vehicular access to it is currently not allowed. Access approximately one mile further up the roadway was provided at one time; however, the Park gated the roadway to prevent vehicular access because of inadequate parking, restricted room for vehicles to turn around, and the broken and potholed pavement condition. The road is currently utilized by pedestrians for access to the Little River hiking trails and occasionally by Park service vehicles.

Existing Traffic Patterns

Roadway capacities and needs are based on the quality and quantity of use. In defining the type of transportation facility required to service an area, estimating the traffic utilizing the area is the first step. According to historical traffic data and current traffic counts, the District currently generates 986 trips during an average 24- hour period. The term "trip" refers to one vehicle passing through a specific point on a roadway in either

direction. For example, if one (1) vehicle carrying four (4) people enters the District via Elkmont Road for a picnic at noon and then leaves by the same route at 3:00 PM on the same day, that would constitute two (2) trips (one entering trip and one exiting trip). The District currently draws these trips by with hiking, camping and various day- use attractions.

In a traffic study performed for the District in 2004 (McGill Associates 2004), trip distributions were developed based on existing traffic patterns, surrounding population centers, and engineering judgment. It was estimated that a large portion of trips (60 percent) will access the District from the north on Newfound Gap Road from Gatlinburg, Pigeon Forge, Knoxville, and from I- 40. Approximately thirty percent of the trips will access the District from the northwest via Highway 73 from Townsend and Maryville from US 321. Five percent of the traffic will access the site from the north via Little Greenbrier Road from US 321. The remaining five percent will access the site from the south via US 441 from Cherokee, North Carolina.

Traffic and Circulation Study

By observing the monthly variations in traffic recorded on Newfound Gap Road it was determined that two peak traffic periods of interest occur during the year. These include weekdays during the month of July and Saturdays during October. The peak weekday in July represents an average peak period for the purposes of analysis and this traffic condition is expected to occur several times throughout the year. The peak Saturday traffic condition in October occurs only a limited number of times throughout the year on especially "high visitation" days to the Park.

Existing weekday peak hour traffic volumes for the roadways and intersections within the District were analyzed using the methodology outlined in the 2000 edition of the *Highway Capacity Manual* published by the Transportation Research Board. *Highway Capacity Software 2000* was utilized to analyze the roadway segments and unsignalized intersections. The capacity analysis for an unsignalized intersection does not provide an overall level of service, but does provide a level of service for movements that must yield to conflicting traffic. The Levels of Service designations were used as evaluation criteria for this study.

The *Highway Capacity Manual* defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions." Level of Service is a term used to represent different driving conditions, and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers." Level of Service varies from level "A", representing free flow, to level "F" where greater vehicle delays are evident.

For the purposes of this study, two types of capacity analyses were performed. The first type of analysis involves specific sections of roadway and is referred to as a Two- Way Highway Analysis. Two- Way Highway Analysis measures Level of Service in terms of Percent Time Spent Following a vehicle and the average travel speed a vehicle can expect to experience on a defined section of roadway. The Level of Service determined by a two- way analysis varies by the classification of the roadway in question.

There are two classifications of roadways. A Class I roadway most often serves long-distance trips or provides connecting links between facilities that serve long- distance links. Users of a Class I roadway have an expectation of traveling at a high rate of speed and, therefore, mobility is a high priority for these drivers. Class II roadways are facilities which connect Class I facilities, serve primarily recreational traffic or travel through rugged terrain. Motorists on a Class II facility do not necessarily expect to travel at a high rate of speed and mobility is not as critical. Class II facilities only consider Percent Time Spent Following a vehicle in determining the Level of Service. Each of the roadway segments included in this study serve recreational traffic and is considered to be in mountainous terrain and will be analyzed as a Class II facility. Table 3- 21 provides *Highway Capacity Manual* Levels of Service and related Percent Time Spent Following per vehicle for a two- way facility. For example, a Percent Time Spent Following of 80 percent on a Class II facility results in a Level of Service D for that segment.

Table 3- 21: Highway Capacity Manual Levels of Service Criteria

Two- Lane Highways (Class II)	
Level of Service	Percent Time Spent Following
A	0- 40
B	40- 55
C	55- 70
D	70- 85
E	>85

The performance of an intersection also measured in terms of delay per vehicle and presented in terms of Level of Service. Table 3- 22 provides *Highway Capacity Manual* Levels of Service and related delay per vehicle for both signalized and unsignalized intersections. Levels of Service are stated in terms of delay. For example, a delay of 30 seconds for a movement at an unsignalized intersection results in a Level of Service D for that movement.

Table 3- 22: Highway Capacity Manual Levels of Service and Delay

	Unsignalized Intersection	Signalized Intersection
Level of Service	Control Delay per Vehicle (seconds)	Control Delay per Vehicle (seconds)
A	0- 10	0- 10
B	10- 15	10- 20
C	15- 25	20- 35
D	25- 35	35- 55
E	35- 50	55- 80
F	>50	>80

According to the Highway Capacity Manual, "Capacity and other traffic analyses focus on the peak hour of traffic volume, because it represents the most critical period for operations and has the highest capacity requirements." The analysis of Level of Service is based on peak rates of flow within the peak hour.

Per standards set in the *Highway Capacity Manual*, the procedures for the analyses performed for this study are adjusted based on the traffic flow rates that occur during the peak 15 minutes of the peak hour. The adjusted peak hour flow rate to be used in determining the design hour flow rate is found by dividing the peak hour volume by a

"peak hour factor", which has been developed for urban and rural roadways. The *Highway Capacity Manual* recommends a factor of 0.88 to be used for the analysis of rural roadways such as those found within and leading to the District. For example, if a peak hour volume of 1,500 vehicles were observed and a factor of 0.88 was applied for the purposes of analysis, a design hour flow rate of 1,705 vehicles per hour (1,500 vehicles / 0.88) is calculated for the peak 15- minute period of the peak hour. With application of this factor, a traffic volume of approximately 426 vehicles (1,705 vehicles per hour x 0.25 hour) would occur for the peak 15 minute period. This means that the roadway design must consider that approximately 28.4 percent of the total traffic volume is expected to pass through the District in a peak 15- minute period instead of 25 percent (15 minutes of the hour) expected if the traffic arrived uniformly.

2004 Peak Traffic Volumes

As previously discussed, two- way automatic counts were performed at several points within the District in April of 2004. This traffic data was then converted to the two selected time periods of interest: the peak hour traffic occurring on a weekday in July and a Saturday in October. These conversions were made using the average daily traffic (ADT) data provided by the NPS at the automatic traffic recording station on Newfound Gap Road.

The average number of daily trips was then converted to the number of trips expected in both peak conditions using the adjustment factors discussed earlier. The adjustment factors were applied only to trips that were associated with land uses considered to be unconstrained. Constrained trips are associated with land uses with a limited amount of spaces to be used. For instance, the campground is a constrained land use because there are only 220 campsites available for use. Only a certain number of trips can be expected to access the site no matter what the time of year. For the purposes of this analysis, the campground was considered to be fully occupied and, based on guidance provided in the *Highway Capacity Manual* for estimation of trips to campgrounds and other recreation sites, each lot was assumed to produce an average of three trips per day. The hiking trails and day- use trips are considered to be unconstrained since there is essentially no limit to how many people could utilize these land uses during a given period of time. The total number of trips expected to access the District is as follows: on a weekday in July (1,169 trips) and on a Saturday in October (1,340 trips). However, not all of these trips will affect the surrounding roadway network.

Some trips will be considered internal trips. Internal trips are those trips originating from within and ending within Elkmont. For example, a vehicle entering Elkmont that traverses thorough the District visiting the trails, exhibits, restaurant, etc., and exiting Elkmont is considered an external trip. However, if that same trip originated in the campground, at the hotel or at a cabin, it would be considered an internal trip. The number of internal trips is divided into two categories – trip "generators" and trip "attractors". Trip attractors are reflective of the visitation to the District, while trip generators define the amount of travel within the District. Trip generators are facilities associated with lodging accommodations, such as the campground, and, in several of the proposed alternatives, the Wonderland Hotel, Annex and cabins. Trip attractors include features such as the trails, backcountry camping, day- use facilities, exhibits, and the Wonderland Hotel restaurant, as applicable for each alternative. Individual stops at attractors, no matter how numerous or repetitive are considered part of the same trip

(internal or external). The District is expected to generate 915 external trips on a weekday in July and 1,010 external trips on a Saturday in October. Refer to Table 3- 23 for a breakdown of these trips.

Table 3- 23: Existing Traffic Summary of Trip Attractors for the District

Land Use	Number of Trips		
	Average Day	Weekday- July	Saturday- October
Campground	660	660	660
Backcountry Camping	3	5	6
Elkmont Nature Trail	2	3	4
Jakes Creek Trail	31	50	65
Little River Trail	36	58	75
Day- Use	254	393	530
Total	**986**	**1,169**	**1,340**
Internal	**163**	**254**	**330**
External	**823**	**915**	**1,010**

Source: McGill Associates 2004

Analysis of Existing Peak Hour Traffic Conditions

Elkmont Road is the only access point for vehicular traffic into the District. The weekday peak hour traffic condition on this road occurs between the hours of 1:00 PM and 3:00 PM. The peak could occur during either the 1:00- 2:00 or 2:00- 3:00 hour since a recorded traffic volume of 77 vehicles was observed during both time periods. The peak hour volume represents 10 percent of the total daily traffic traveling to/from Elkmont Road on a typical weekday. As for the Saturday peak hour traffic condition, the hour of study was determined to be between 2:00 PM and 3:00 PM and the peak traffic is expected to be 12.5 percent of the total daily traffic. The peak hour traffic conditions analyzed as part of this study were determined by using 10 percent of expected daily weekday traffic in July and 12.5 percent of daily Saturday traffic expected in October as the peak hour volumes.

In order to determine the current Level of Service of the roadway segments and the intersection within the District, the 2004 traffic volumes were analyzed under existing lane configurations and traffic control conditions. The results of the two- way roadway analysis are presented in Table 3- 24 and the results of the intersection analysis are presented in Table 3- 25.

Capacity analysis indicates that the roadway segment of Newfound Gap Road from the Sugarlands Visitor Information Center to Little River Road currently operates at an undesirable Level of Service D during the weekday and at a Level of Service of E during Saturday peak hour traffic conditions. These poor Levels of Service are due primarily to high traffic volumes caused by seasonal traffic visiting the area. Capacity analysis also indicates that the roadway segments on Little River Road and Little Greenbrier Road operate at an acceptable Level of Service C or better during the weekday peak hour and an acceptable Level of Service D or better during the Saturday peak hour traffic condition.

Capacity analysis of the unsignalized intersection indicates that the westbound left turn movement from Little River Road onto Elkmont Road experiences minor delays (of less than 10 seconds/vehicle) and operates at Level of Service A during both weekday and

Saturday peak hours. In addition, the minor approach of Elkmont Road operates at Level of Service B during the weekday peak hour and Level of Service C during the Saturday peak hour. These are acceptable levels of service.

Table 3- 24: Analysis of Existing (2004) Traffic Conditions (Two- Way Roadway Analysis)

ROADWAY SEGMENT	WEEKDAY		SATURDAY	
	Level of Service	Percent Time Spent Following	Level of Service	Percent Time Spent Following
Newfound Gap Road: Sugarlands Center to Little River Road	D	83.1	E	92.2%
Little River Road: Newfound Gap Road to Elkmont Road	C	66.7	D	75.3%
Little River Road: Elkmont Road to Little Greenbrier Road	C	63.4	D	73.4%
Little Greenbrier Road: Little River Road to US 321	A	38.7	B	44.8%
Little River Road: Little Greenbrier Road to Highway 73	C	61.7	D	71.4%

Table 3- 25: Analysis of Existing (2004) Traffic Conditions (Unsignalized Capacity Analysis)

INTERSECTION	APPROACH	LANE CONFIGURATIONS	PEAK HOUR LEVEL OF SERVICE	
			WEEKDAY	SATURDAY
Little River Road	WB	1 Left Turn –Through	A[1]	A[1]
	EB	1 Through – Right Turn		
[1] Elkmont Road	NB	1 Left Turn, 1 Right Turn	B[2]	C[2]

[1]Level of service for left turn movement on major approach
[2]Level of service for minor approach

Projected (2015) Traffic

Background traffic volumes are needed to estimate the growth of traffic and subsequent change in traffic conditions projected under each alternative. Background traffic is that component of traffic due to growth of the surrounding area that is anticipated to occur regardless of whether the proposed alternative is implemented. The future year of analysis was selected by looking at a period of time ten years beyond the completion of the EIS process. For the purposes of this study, it is assumed that any improvements to be made to the District will be completed and potential lodging facilities may be approaching peak occupancy by 2015.

The year 2015 daily traffic volumes were estimated by applying an annual growth rate to existing (2004) traffic volumes. Historical visitation data for the Park were used to determine an annual growth rate for this area. In 2001, the annual number of visitors to the Park was 9,457,373. Historical visitation data indicate an annual growth rate of approximately one percent over the most recent twelve years of data available. Projected visitation for Elkmont Historic District through 2015 is provided in Table 3- 19.

Analysis of Background (2015) Traffic Conditions
The background year 2015 peak hour traffic volumes were analyzed using the methodology outlined in the *Highway Capacity Manual* as previously noted for the existing traffic conditions. The results of the two- way roadway analyses and unsignalized intersection analysis are presented in Tables 3- 26 and 3- 27.

Capacity analysis indicates that the roadway segment of Newfound Gap Road from the Sugarlands Visitor Information Center to Little River Road continues to operate at an undesirable Level of Service E during the weekday peak hour and the operation deteriorates to a failing Level of Service during the Saturday peak hour. These poor Levels of Service are due primarily to the high traffic volumes occurring on this roadway segment due to seasonal traffic accessing the area. Capacity analysis also indicates that the roadway segments on Little River Road and Little Greenbrier Road operate at an acceptable Level of Service D or better during both the weekday and Saturday peak hour traffic conditions.

Table 3- 26: Analysis of Background (2015) Traffic Conditions (Two- way Roadway Analysis)

ROADWAY SEGMENT	WEEKDAY		SATURDAY	
	Level of Service	Percent Time Spent Following	Level of Service	Percent Time Spent Following
Newfound Gap Road: Sugarlands Center to Little River Road	E	87.7	F	N/A
Little River Road: Newfound Gap Road to Elkmont Road	D	71.5	D	77.6%
Little River Road: Elkmont Road to Little Greenbrier Road	C	66.9%	D	73.8
Little Greenbrier Road: Little River Road to US 321	B	41.1%	B	46.5%
Little River Road: Little Greenbrier Road to Highway 73	C	64.8%	D	74.0%

Capacity analysis of the unsignalized intersection indicates that the westbound left turn movement from Little River Road onto Elkmont Road and the minor approach of Elkmont Road both continue to operate at acceptable Level of Service during the weekday and Saturday peak hours.

The data in Table 3- 27 show that the traffic conditions at the intersection of Little River and Elkmont Roads remains at an acceptable Level of Service through the period to 2015.

Table 3- 27: Analysis of Background (2015) Traffic Conditions (Unsignalized Capacity Analysis)

INTERSECTION	APPROACH	LANE CONFIGURATIONS	PEAK HOUR LEVEL OF SERVICE	
			WEEKDAY	SATURDAY
Little River Road	WB EB	1 Left Turn - Through 1 Through – Right Turn	A	A
Elkmont Road	NB	1 Left Turn, 1 Right Turn	B	C

The proposed changes to the District for each project alternative must be considered in the analysis as well in determining a future Level of Service for roadways affected by implementation measures in that alternative. These potential effects on the Level of Service of roadways within the District are provided and discussed in detail in Chapter 4 for each of the proposed alternatives.

Parking Lots

During peak visitation, parking within the District is inadequate. The primary destinations within the District, excluding the campground, are the Little River Trail trailhead and Jakes Creek trailhead. Of these, only Jakes Creek trailhead has any parking space dedicated for use, and that space is inadequate for the demand of the peak season.

Wonderland Hotel and Adjoining Cabins

There currently are no parking areas dedicated to serving the Wonderland Hotel area. Visitors who wish to walk up to the Wonderland Hotel area park off the road in the dirt/gravel road shoulder at the base of the Hotel steps, where there is sufficient room for approximately six (6) cars. Others may park in the few parking spaces of an asphalt parking area in front of the visiting scientist apartments (Building 600) across from the Wonderland Hotel steps, if there are spaces available. This asphalt parking area is in generally good condition and receives relatively little use. A larger gravel/dirt parking area behind the existing Wonderland Hotel currently is not accessible to the general public because the road to the Hotel is gated. This lot has the potential to provide parking for approximately 35 cars if it were available for parking. It is in generally fair condition, but would quickly deteriorate with regular vehicular traffic. This lot is not considered ADA compliant due to the condition of its gravel surface.

Appalachian Clubhouse and Adjoining Cabins

Daisy Town currently has one gravel parking lot adjacent to the Appalachian Clubhouse that could accommodate between 10 and 15 cars. Since this area is not currently a popular destination within the District, this lot is not typically filled to its capacity. For this reason, the existing gravel surface is in generally good condition, but would deteriorate quickly with increased vehicular traffic. This lot is not considered ADA compliant due to the condition of its gravel surface.

Jakes Creek Trailhead

The Jakes Creek Trailhead parking lot is located along Jakes Creek Road just below the access point to the trail. This parking lot has a gravel/dirt surface and is little more than a

wide spot in the road, capable of providing parking for approximately eight cars. On weekends during the peak season, it is estimated that as many as 30 cars are parked in this area to access Jakes Creek Trail (NPS 2002a). The parking pattern is random and uncontrolled in this area.

Little River Trailhead

The Millionaire's Row area serves as the trailhead for the Little River hiking trail and its connecting trails. There are currently no designated parking lots in this area. Parking is accomplished randomly and uncontrolled in the gravel/dirt shoulders along the sides of the road as space permits. Roadside parking can safely accommodate approximately 12 cars. Estimated average use of this area for parking is similar to that experienced at the Jakes Creek trailhead, with the addition of those who use the trail to access the river for fishing (NPS 2002a). This would indicate peak parking of approximately 35 cars per day.

In addition, one parking area approximately 3,055- square- feet, exists along Elkmont Road within the District. This lot provides parking for visitors hiking on the Elkmont Nature Trail. Another area, approximately 1,936- square- feet in size, is located outside the District along Little River Road beside the Little River for trail access.

3.5 Other Resources

3.5.1 Viewshed

The aesthetic value of an area can be assessed by examining the visual character and quality of an area, while also considering the viewer response to that area or view. The visual character of a place is the product of both the natural features and those created by human development such as roads, buildings and bridges. Visual quality is assessed by examining the vividness, intactness and unity of the view, defined as follows (StanCOG 2001):

- Vividness is the visual power or memorability of landscape components (how distinctly landscape components are remembered) as they combine in striking or distinctive visual patterns
- Intactness is the visual integrity of the natural and human –built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole.

A viewshed is defined as all of the surface area that can be viewed with an unobstructed sightline from a specific location or series of locations, such as a hilltop overlook, road way or trail. In addition to examining the visual character and quality of an area, the perspective of the viewer must also be considered when evaluating a viewshed. The sensitivity and response of the viewer can be wide ranging. For instance a person traveling to work would not be very sensitive to the details in the surrounding landscape, but visitors walking or driving through a national park would be traveling at a slower pace and have a much greater awareness of the views around them (high visual sensitivity) (StanCOG 2001). The regional context should be considered as well, given that a human built structure would be a much more significant visual element in an area dominated by natural features than it would in an urban setting.

The District is situated within the valley formed by the Little River and its associated tributaries. While most of the development in the District has occurred in low lying, relatively open areas adjacent to the river and its tributaries, the Wonderland Hotel and adjacent buildings are located on a ridgeline that is generally hidden from the main road. Due to relatively dense forestation, topography and/or overgrown vegetation adjacent to buildings, the majority of the historic buildings have obstructed views of 100 feet or less. Many areas that were previously open pasture have succeeded to a variety of woody species. The vegetation is predominately native to the area and includes a variety of evergreens, deciduous and herbaceous plants. However, former human occupation has resulted in the introduction of many non- native plant species as well.

Most of the District's visitors are pedestrians or vehicle occupants traveling at a relatively low speed. Since these visitors have more opportunities to observe the viewsheds than a faster moving vehicle simply because they will be traveling at a slower rate, the intensity of the views (or the frequency of the selected viewpoints) will be high. Visual quality also changes naturally over time as vegetation type and condition can be altered rapidly by fire, insects, weather and man- made impacts.

Viewshed Mapping

The viewshed can consist of a plan view or a map of areas. To analyze the viewshed in the District, different techniques were used to assess the visual sensitivity. These techniques included the use of ARCGIS Spatial Analyst (Version 9.0) computer software to illustrate views of and from the transportation and pedestrian corridors within the District. This software uses data points at approximately 10- foot increments along the corridors to define visual resources and the intensity of those resources. This software analyzes the digital terrain to identify areas that may be viewed without the consideration of vegetation to simulate winter views. Parameters are also modified within the software to represent a summer view by restricting the field of view evaluated by the software. In the District, the majority of the buildings have obstructed views of 100 feet or less. This method is used to evaluate the intensity of viewsheds experienced by a typical visitor to the District.

To assess the linear features of Elkmont, three (3) composite viewshed maps were prepared (see Appendix D). The composite viewshed combines individual viewsheds along a road or trail and combines them to assess which areas are most visible from the corridor. Viewpoints were considered at approximate 10- foot intervals along the corridors. This interval spacing was derived by considering the user group, which consists primarily of pedestrians or vehicle occupants traveling at a relatively low speed. The viewshed maps in Appendix D are separated into different areas to allow an assessment of each area. The smaller areas mapped were Elkmont Road (Figure 1), Wonderland Club Area (Figure 2), Daisy Town Area (Figure 3), Campground Area (Figure 4), Jakes Creek Area (Figure 5), and Millionaire's Row Area (Figure 6). Each small area's multi- point viewshed map used the vehicular or pedestrian corridors as the viewpoint. The visible land was broken into three shades of red. The dark red areas indicate the land that is seen from the most viewpoints while the light red is seen from the fewest number of viewpoints.

The small area viewshed maps were combined to create composite viewshed maps for the entire District (Figures 7, 8 and 9). These composite viewsheds were mapped using

three (3) different techniques to show the viewshed visibility. The first map was created in the same manner as the small area map using three (3) shades of red referring to the most and least visible areas (Figure 7). The second map was created using five (5) shades of red referring to the visible land (Figure 8). This map was created to determine the most critical areas of the District.

The third map used existing vegetation as a factor in the viewshed assessment (Figure 9). Vegetation changes rapidly due to fire, insects, weather and man- made impacts and is typically not used as a control measure for visual assessment. Because most of the areas in the District have some degree of vegetation, this viewshed map uses a boundary of one hundred feet on both sides of the viewshed corridors. One hundred feet on both sides of the corridor was considered the average foreground visibility of these corridors during spring and summer season when deciduous vegetation is in full leaf.

The findings of this study show that most existing long- range views occur from and along the existing transportation corridors. However, because these corridors exist generally along low- lying areas of the valley, the opportunity for panoramic views is limited, again, by topography and vegetation. Therefore, most viewsheds are limited to individual areas of the District (Wonderland area, Millionaire's Row area, etc.).

Photo- Realistic Simulations

In addition to the mapping technique described above, representative photo- realistic simulations have been prepared. Digital photographs were taken from several areas of the District and are provided in Appendix D. Most of the photographed areas represent historically or architecturally significant views, while others are areas where parking lots are proposed. The purpose of the simulations is to show the existing condition and demonstrate the potential visual impacts of some of the components of the proposed Alternatives. The simulations illustrate the visual effects of removing existing buildings and design techniques used to mitigate viewshed impacts through the use of vegetation buffers in proposed parking areas. This work is intended to demonstrate impacts on specific buildings to generally relate the magnitude of changes associated with other buildings within the District. Representative simulations were created at the following locations: Appalachian Club Parking Area, Daisy Town Parking Area, Vernon Moore Cabin (58- 1A), Beaman Cabin (58- 8H), Daisy Town Cabins and Parrot Cabin (44).

3.5.2 Soundscape

Sound currently generated within the Elkmont Historic District consists of natural sound from rivers, creeks, animals, etc. and human- produced sounds, such as those produced by vehicles visiting the District, campground sounds (noise made by power generators, human interaction, etc.), and sounds made by maintenance equipment. It is expected that numerous sources of human- produced sound will result from this project. These sounds may come from sources such as exhaust fans on heating, ventilation and air conditioning (HVAC) systems, electrical motors on vents, gas- powered motors on various types of machines (landscaping equipment), and construction noises, etc. One of the primary human- produced sources of sound will likely be additional vehicles entering the site.

Noise is basically defined as unwanted sounds. It is emitted from many sources including airplanes, factories, railroads, power generation plants, and highway vehicles. Traffic noise

is usually a composite of noises from engine exhaust, drive train, and tire- roadway interaction. The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, usually described in decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency weighted scales (A, B, C, or D). The A- weighted decibel scale is used in vehicular noise measurements because it places the most emphasis on the frequency range to which the human ear is most sensitive (1,000 to 6,000 Hertz). Sound levels measured using the A-weighted decibel scale are often expressed as dBA. Throughout this report, all noise levels will be expressed in dBA's. Several examples of noise pressure levels in dBA are listed in Table 3- 28.

Table 3- 28: Noise Levels for Common Sounds

(dBA)	Common Sounds	Noise Impact
140	Shotgun blast	
	Jet 100 feet away at takeoff	Pain
	Motor test chamber	Human ear pain threshold
130	Firecrackers	
120	Sever thunder	
	Pneumatic jackhammer	
	Hockey crowd	
	Amplified rock music	Uncomfortably loud
110	Textile loom	
	Subway / elevated train, heavy city traffic	
	Farm tractor, power lawn mower	
	Newspaper press, noisy factory	Loud
90	Diesel truck at 40 mph 50 feet away	
80	Crowded restaurant, garbage disposal	
	Average factory, vacuum cleaner	
	Passenger car at 50 mph 50 feet away	Moderately loud
70	Quiet typewriter	
60	Singing birds, window air- conditioner	
	Quiet automobile	
	Normal conversation, average offices	Quiet
50	Household refrigerator	
	Quiet office	Very quiet
40	Average home	
30	Dripping faucet	
	Whisper 5 feet away	
20	Light rainfall, rustle of leaves	Average person's threshold for hearing
	Whisper	Just audible
10		
0		Threshold for acute hearing

Sources: World Book, Rand McNally Atlas of the Human Body, Encyclopedia Americana, "Industrial Noise and Hearing Conversation" by J. B. Olishifski and E.R. Harford (Researched by N. Jane Hunt and published in the Chicago Tribune in an illustrated graphic by Tom Heinz).

Most individuals are exposed to fairly high noise levels from many sources as they go about their daily activities. The degree of disturbance or annoyance of unwanted sound depends essentially on three things:

1) The amount and nature of the intruding noise.

2) The relationship between the background noise and the intruding noise.
3) The type of activity occurring where the intruding noise is heard.

In considering the first of these three factors, it is important to note that individuals have different hearing sensitivities to noise. Loud noises bother some more than others and some individuals become agitated if an unwanted noise persists. The time patterns of noise also enter into an individual's judgment of whether or not a noise is offensive. For example, noises occurring during sleeping hours are usually considered to be much more disruptive than the same noises in the daytime. With regard to the second factor, individuals tend to judge unwanted noise in terms of its relationship to noise from other sources (background noise). The blowing of a car horn at night when the background noise levels are low would generally be more objectionable than the blowing of a car horn in the afternoon when background noise might be high. The third factor is related to the interference of noise with activities of individuals. In a 60 dBA environment, normal conversation would be possible while sleep might be difficult. Activities requiring high levels of concentration may be interrupted by loud noise while activities requiring manual effort may not be affected to the same degree.

Abatement Criteria

The Federal Highway Administration (FHWA) noise abatement criteria (NAC) set forth in the Code of Federal Regulations, Title 23 CFR, Part 772 were used to evaluate existing and future noise levels. A summary of the noise abatement criteria for various land uses is presented in Table 3- 29. This study focused on Category B criteria because this activity category most closely resembles the types of activities that occur within the District now and will continue into the future. To be consistent with the NAC, the Equivalent Sound Level (Leq) will be used for this study. The Leq is a level of constant sound that, in a given situation and time period, has the same energy as sound levels that vary over time. In other words, the fluctuating sound levels are represented in terms of steady noise level with the same energy content.

Table 3- 29: Noise Abatement Criteria (Hourly A- Weighted Sound Level – decibels [dBA])

Activity Category	Leq (h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extreme significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	Picnic areas, recreation areas, playground, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B
D	- - -	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: Title 23 Code of Federal Regulations, (CFR) Part 772, U.S. Department of Transportation, FHWA

Ambient sound level measurements were conducted to quantify the existing noise levels in the District for the purposes of comparing this base information to future noise levels. Table 3- 30 presents sound readings conducted on Friday, April 16 and Saturday, April 17, 2004 within the District between the hours of 6:00 pm and 8:30 pm. Table 3- 31 presents

readings conducted on Sunday, April 18, 2004 at two locations at the Cades Cove visitor center between 12:30 pm and 1:30 pm. The time period of the readings conducted within the District were taken during a period of the day when activity was somewhat minimal, while the readings taken within Cades Cove were taken during a period of significant activity. The differing time periods provide a conservative comparison between the two reading sites. Tables 3- 30 and 3- 31 illustrate the noise measurement locations and resulting levels.

Table 3- 30: Ambient Sound Level Readings within Elkmont Historic District

Site No.	Date	Location	Sound Level Leq - dBA	Comments
1	4/17/04	End of road near Cemetery	36.5 dBA	sunny, light wind (~0- 5 mph); some birds
2	4/17/04	In front of hotel at old fountain	46.9 dBA	sunny, light wind (~0- 5 mph); some birds; river nearby could be heard
3	4/17/04	Parking lot behind hotel	43.3 dBA	sunny, light wind (~0- 5 mph); some birds; river nearby could be heard
4	4/17/04	Next to Elkmont Road at hotel steps	51.7 dBA	sunny, light wind (~0- 5 mph); some birds; river nearby could be heard; 2 cars passed meter during reading
5	4/17/04	Nature Trail parking lot near campground	49.4 dBA	sunny, light wind (~0- 5 mph) some birds (woodpecker nearby) river nearby could be heard children in campground could be heard
6	4/17/04	Millionaire's Row	55.3 dBA	Evening , light wind (~0- 5 mph) river nearby could be heard – loud
7	4/17/04	Parking lot Millionaires Row	48.7 dBA	Evening , light wind (~0- 5 mph) river nearby could be heard 1 minivan started during reading
8	4/17/04	Jakes Creek Trailhead on road near creek	60.4 dBA	very light wind (~0- 5 mph) some birds; river nearby could be heard
9	4/17/04	Society Hill	50.8 dBA	very light wind (~0- 5 mph) river nearby could be heard
10	4/17/04	Daisy Town At beginning of one- way road	50.1 dBA 46.8 (no cars) 58.9 (diesel truck) 53.7 (Ford Expedition)	very light wind (~0- 5 mph) some birds; river nearby could be heard
11	4/17/04	In front of Appalachian Clubhouse	52.0 dBA	very light wind (~0- 5 mph) some birds; river nearby could be heard; jeep started during reading
12	4/17/04	Gate to Jakes Creek Cemetery	50.1 dBA	very light wind (~0- 5 mph)
13	4/17/04	Campground – Loop C near Little River Rd	43.5 dBA 41.8 (no vehicles)	Evening, light wind (~0- 5 mph) some birds; river and people talking nearby could be heard

Ambient noise levels measured within the District ranged from as low as 36.5 dBA to as high as 60.4 dBA. Sound levels measured away from rivers/creeks and human- produced sound generators were relatively low, one of which measured below 40 dBA. Sound

levels near rivers and vehicles were relatively high, one of which exceeded 60 dBA near Jakes Creek Trailhead, due to the noise generated by Jakes Creek. There was little distinction between sound levels recorded near rivers/creeks and vehicles. Depending upon the distance from the source, noise levels were about the same for a car or sport utility vehicle and a swift moving river or creek. A variety of readings were taken of similar vehicles at similar distances from the meter to verify the readings. In addition, sound readings were compared for similar responses to the same input source to ensure the accuracy of the meter.

As previously mentioned, sound readings were taken at two locations within Cades Cove to determine human- produced noise levels for "exhibit- type" land uses. While it is not exactly representative of Elkmont Historic District, these readings do represent sound levels that are generated by visitors arriving by vehicles and interacting within the Cades Cove environment. Both measurements were conducted on April 18, 2004, the weekend after Easter when some schools were on Easter vacation.

Table 3- 31: Ambient Sound Level Readings at Cades Cove

Site No.	Date	Location	Sound Level Leq - dBA	Comments
1	4/18/04	Cades Cove Information Center in grass near parking lot adjacent to visitor information stand	54.9 dBA	sunny, light wind (~5- 10 mph) people talking ~20 ft. away vehicles starting in parking lots vehicle doors opening/closing children playing ~50 ft. away vehicles passing Visitor Center on Cades Cove Rd ~20 mph 84 vehicles (cars, trucks and vans) were counted during sound measurement (15 minute period)
2	4/18/04	Abram's Visitor Center in grass in center of gravel parking lots ~100 vehicles in parking lot at start of reading with continuous vehicle "turn-over"	52.8 dBA	sunny, light wind (~5- 10 mph) children/people talking ~20 ft. away; vehicles starting/stopping in parking lots; vehicle doors opening/closing; vehicles traveling around parking lot loop ~5- 10 mph; crows squawking READINGS OF VARIOUS VEHICLES 39.5 dBA – no vehicles or people 55.0 dBA – vehicles on both sides of meter 62.7 dBA – loud diesel truck entering lot (> 100 feet from meter) 52.5 dBA – normal car 48.3 dBA – car starting 100 ft. from meter 52.5 dBA – car starting 50 ft. from meter 49 to 65 dBA – two motorcycles

Sound levels at Site No. 1 shown in Table 3- 31 were recorded at the entrance to Cades Cove in a grassy area near the visitor center booth adjacent to the paved parking lot. A total of 84 vehicles were counted during the 15- minute recording period. The majority of these vehicles stopped at the visitor's center, with the remaining continuing on to the Cades Cove loop. Travel speed was estimated to be an average of approximately 15 to 20 mph. People were interacting near the visitor booth. The sound meter was located approximately 30 feet from both the visitor booth and the parking lot. While several vehicles generated very high sound levels (in excess of 60 dBA), the Equivalent Sound Level for the period was 54.9 dBA.

Sound readings at Site No. 2 shown in Table 3- 31 were measured in a grassy area located between the parking lot loop road near the entrance to the Abram's Visitor Center. Several gravel parking areas are located in this area. A total of 65 vehicles were counted during the recording period (29 vehicles entered and 36 exited). There were approximately 100 vehicles parked at the facility at the beginning of the study. Travel speed was estimated to be an average of approximately 5 to 10 mph. The sound meter was placed in the center of the parking lot loop road, approximately 20 feet away from the road on each side. Although there were several different types of vehicles each generating various levels, there were periods with no human- produced sound. The resulting Equivalent Sound Level for the period was 52.8 dBA.

As shown in Table 3- 31, several "instantaneous" readings of various vehicles were conducted. These readings were taken in an effort to show what can be expected from differing types of vehicles traveling though the District. With no vehicles or other human- produced sound, the ambient sound level was 39.5 dBA. One reading reached 65 dBA, an increase of over 25 dBA, when two motorcycles passed 20 feet from the meter. However, it should be noted, that these readings represent the maximum sound level of the reading over a very short period of time (less than one minute) and not the steady sound level given by Equivalent Sound Level over an extended period of time.

3.6 NPS Operations

Current NPS operations include maintenance of existing infrastructure. Existing condition of the infrastructure at Elkmont Historic District is described in the following paragraphs.

Wastewater Treatment

Existing Sanitary Sewer Facilities

The Park operates a wastewater collection and treatment system in the Elkmont Historic District within the Park. Currently, a wastewater collection system consisting of gravity sanitary sewers serves the campground, located in the center of the District. Campground wastewater treatment and disposal is provided by an activated- sludge wastewater treatment plant. There is also an inactive gravity sanitary sewer line serving the Daisy Town and Society Hill cabin areas, with treatment and disposal formerly provided by a septic disposal system. Gravity sewers connect the Wonderland Hotel and adjoining cabins to a separate inactive septic disposal system.

Elkmont Campground Collection Systems

The Elkmont Historic District has a gravity sanitary sewer system that currently serves twelve restrooms in the campground areas. The system has two main branches with one

branch located on either side of the Little River. The western branch extends from the wastewater treatment plant, south along the campground roadway and ends at the southern most campground restroom. The eastern branch serves campsites on the eastern side of the Little River and connects to the western branch via an under- stream crossing of the Little River just north of the Elkmont Campground Bridge.

Visual observations of the campground sanitary sewer system were made by opening several manholes and indicated that the sewer pipe is most likely composed of cast iron material in adequate (usable, but showing signs of wear and maintenance needs) condition. All manholes observed were constructed of prefabricated concrete and appeared to be in good (usable, showing little sign of wear and require little or no maintenance) condition. During the collection system inspection, some water was observed moving through manholes even though the restrooms were closed for the winter. This indicates that the collection system may be experiencing inflow and infiltration, a condition where surface or ground water migrates into the system through leaks in pipes or manholes.

Elkmont Wastewater Treatment Plant

The District's wastewater treatment plant currently serves the Elkmont campground areas. The plant, constructed in the mid to late 1960s, is an extended aeration activated sludge wastewater treatment process and operates nine (9) months of each year. In accordance with campground operation, the plant is closed during the winter months (December to February). It has a design treatment capacity of 35,000 gallons per day (gpd). Based on historical operating records provided by the Park, average daily flows processed through the plant have been approximately 12,000 gpd during the past three (3) years. However, due to the seasonal nature of the campground that it serves, fluctuations in daily flows are common, with numerous maximum daily flows exceeding 30,000 gpd.

Wastewater enters the plant via a gravity sewer through a comminutor, a piece of mechanical equipment that grinds up larger material as it passes through a coarse screen. After screening, the wastewater flows by gravity into the extended aeration basin for treatment and then to final clarifiers where solids are settled out. Wastewater leaves the final clarifiers and flows through a Micro- Floc tube settler and mixed media tertiary filters. Disinfection of the treated wastewater is accomplished using sodium hypochlorite solution (liquid chlorine bleach). Dechlorination is achieved using sodium sulfide tablets. After dechlorination, treated wastewater is discharged into the Little River at river mile 49.7 via a gravity outfall sewer. The remaining sludge is removed to a sludge holding tank by air- lift pumps and is hauled to the Gatlinburg wastewater treatment plant for final treatment and disposal.

The Elkmont wastewater treatment plant contains a conventional extended aeration activated sludge biological process with tertiary filtration. This is a time- tested treatment process that typically performs very well under a variety of wastewater flow conditions. The extended aeration process has built- in buffering capacity allowing influent flows to be erratic during the course of a day. This allows the treatment plant to receive flows that vary both above and below the 35,000 gallon per day (gpd) design flow for the plant. This treatment flexibility is needed to accommodate the variable diurnal

flow characteristics that result from the campground and those that would result if new wastewater sources are generated in the future.

The hydraulic design capacity of the wastewater treatment plant, which is currently 35,000 gpd, is based on average day flows with the capability to adequately treat much higher daily flows for short periods of time. Since the wastewater treatment plant must react to the flows that are received on a variable basis day- to- day, the hydraulic design capacity is not a permit limit parameter. This allows the plant flow to vary considerably while maintaining adequate biological treatment to meet the Little River discharge parameters.

Monthly Operating Reports for the Elkmont wastewater treatment plant for the years 1998 through 2003 indicate that the average daily flow through the plant is 9,976 gpd. The average daily flow for the years 1998 through 2000 was 7,660 gpd and for the years 2001 through 2003 was 12,291 gpd. The reason for these average day flow variations cannot be determined. As a result, a conservative approach to dealing with wastewater changes would utilize the average flow for the more recent three (3) year period for base average flow conditions.

The Monthly Operating Reports also show several days where the plant flow exceeded 30,000 gpd. Many of these high flow days result from operational issues, such as the recirculation of decanted backwash water and flush valve problems in the campground restrooms. When considering these issues, the peak day flows for wastewater are approximately 30,000 gpd.

Overall, the plant is in good condition and suited for continued use. The plant has consistently operated well within the discharge parameters described in its permit. However, the plant operator has commented that some repair and/or upgrades may be necessary to the existing tertiary filters at the plant. These items may include regular maintenance issues, such as the replacement of the filter media, and/or some electrical/control upgrades to allow the operator improved performance of the filter equipment.

Appalachian Clubhouse and Adjoining Cabins

A gravity sewer system connects the Appalachian Clubhouse and an undetermined number of cabins in the Daisy Town and Society Hill areas to an inactive septic disposal system located in the vicinity of the Appalachian Clubhouse. Because this collection and disposal system was installed and maintained by residents of the cabins, historical information concerning the location and condition of this collection and disposal system is unavailable. However, discussions with a former cabin resident and Park personnel indicate that the gravity sewer collection system was installed in the Daisy Town and Society Hill cabin areas in the early 1980s. This system was constructed in front of the Society Hill cabins. Field observations of the sewer system indicate that it is in fair to good condition. The sewer system has line cleanouts located at cabin service connections. The specific condition of the sewer system cannot be determined without cleaning the sewer line and conducting a visual inspection with a sewer line camera. If the sewer line cannot be rehabilitated and reused, it would have to be replaced. It is not practical at this time to determine the location, capacity and condition of the existing septic disposal system at the Appalachian Clubhouse due to the extensive ground

excavation that would be necessary. For the purposes of this study, the Park has assumed that the existing sewer system would require replacement.

An older sewer system was identified that formerly served the Society Hill cabins. This system was constructed under and to the rear of the cabins in very close proximity to Jakes Creek. Visual evidence of this system can be found due to its very shallow depth. Due to the deteriorated physical condition of this existing system and its inability to comply with current regulations, its reuse is not recommended.

The cabins located on Millionaire's Row have indoor plumbing and are served by a community sewer line installed between the cabins. This line has been visually observed in several locations near some of the cabins. The condition of this sewer line is unknown. The final disposal of this wastewater is thought to be through use of a septic system, but this has not been confirmed. No visible signs of potential drain field locations were identified during the field investigation and delivery of this wastewater to other known septic system locations (specifically the Appalachian Clubhouse) via a conventional gravity system would not be practical.

Wonderland Hotel and Adjoining Cabins

Historical records indicate that the Wonderland Hotel and an undetermined number of adjoining cabins are connected to a septic disposal system by gravity sewers. Two (2) septic disposal systems are located along Elkmont Road on the western and southern sides of the Hotel. The specific condition and capacity of the septic systems is unknown and cannot be practically determined at this time due to the extensive ground excavation that would be necessary. Based on the information that is known abut the existing sewer system, the Park is assuming that complete replacement will be necessary to meet all project requirements for the alternatives that require use of the system.

Water Supply and Distribution

Existing Water Supply and Distribution Facilities

The Park operates a water supply and distribution system in the Elkmont Historic District. Currently, a water system consisting of a single well, three water storage tanks, and distribution pipelines serves the campground areas. There is an abandoned water supply system through the Daisy Town and Society Hill cabin areas. This water system consists of two (2) water storage tanks (one (1) wooden and one (1) steel), located above the Kuhlman cabin on the upper end of Society Hill, and a distribution system providing water to the Society Hill and Daisy Town cabins via a water line located adjacent to Jakes Creek and the older abandoned sewer line. Existing pipes indicate that the Wonderland Hotel and neighboring cabins, as well as the cabins in the Millionaire's Row area, were at one time connected to a water distribution system. However, the specifics of those systems are not practical to determine at this time due to the excessive excavation that would be required. Due to the age and deteriorated condition of the portion of the system examined, it is unlikely that any of it could be reused.

Elkmont Water Supply

Currently, the water supply for the Elkmont area is provided by a single well located up Jakes Creek Road, beyond the Society Hill cabins. This well supplies water to the Elkmont campground, four apartments and one residence house. A 5- horsepower

pump delivers well water to three holding tanks located above Jakes Creek Cemetery. The tanks consist of two 27,800- gallon fiberglass tanks and one 45,000- gallon concrete tank, for a total storage capacity of 100,600 gallons. The pump is capable of delivering 60 gallons per minute to the holding tanks. During peak season, approximately 22,240 gallons of water per day is delivered to the campground, apartments and residence house, requiring slightly more than six (6) hours of pumping time.

Elkmont Campground Distribution System

Water is gravity- fed to the campground and residences from the storage tanks via an underground piping system. The piping system consists of a 6- inch diameter water pipe that crosses underneath the Little River and is buried 2 feet below the streambed. An inspection, conducted by the TDEC in 2001, found that the inside of the concrete water storage tank at Jakes Creek Cemetery was deteriorating. Consequently, the inside of the water tank was refinished in May 2002. Other deficiencies noted in the inspection included a major leak of unknown origin and the need for a backflow prevention valve in the equine water trough near the well location. Each of these deficiencies has been addressed. The concrete tank interior and fiberglass tanks were added. These are the only major improvements made to the system since 1993.

Appalachian Clubhouse and Adjoining Cabins

Cabins in the Society Hill, Daisy Town, and Millionaire's Row areas are on a separate water supply and distribution system from the campground system. This system, which has been abandoned since the cabins were vacated, consists of a small dam across Tulip Creek and a steel water storage tank, located at the upper end of the Society Hill area. A water distribution line runs beneath the Society Hill and Daisy Town cabins and to the Appalachian Clubhouse. Since the cabins in the Millionaire's Row area also contained plumbing fixtures and no other visible source of water has been observed, this system may also have served the cabins in the Millionaire's Row area. The actual locations of these water lines cannot be determined without additional historical information or significant subsurface excavation. The current condition of this entire system is questionable, and further evaluation of the system would require significant excavation of the pipelines for visual inspection. Based on the condition of portions of the system that were visible, it was determined that re- use of the existing lines would not feasible.

Wonderland Hotel and Adjoining Cabins

Physical evidence exists that the Wonderland Hotel, Annex, and neighboring cabins were served with running water. This evidence includes the existence of small- diameter PVC water supply lines under the hotel servant's quarters building and at some cabins, and the existence of modern plumbing fixtures in some of the cabins. Determining the details of those services would require historical information or significant subsurface excavation. As with the service to the Appalachian Clubhouse, the current condition of that entire system is questionable and unlikely to be suitable for continued use.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

NEPA requires that a range of reasonable alternatives and the unavoidable environmental consequences associated with implementation of the alternatives be revealed prior to undertaking proposed federal actions. This chapter provides a summary of the analysis of the environmental consequences associated with implementation of the No Action Alternative and a full range of action alternatives. The No Action Alternative is consistent with the management direction provided in the 1982 General Management Plan and builds upon and incorporates the findings of NEPA documents associated with the 1982 Plan. Actions required to implement each of the proposed alternatives are described in Chapter 2: "Alternatives, Including the Environmentally Preferred Alternative". The NPS may amend the management direction provided in the 1982 Plan with the new direction provided by the agency preferred alternative selected during this process.

The goals of NPS management for all resources are achieved through consideration of the potential resource impacts associated with each alternative and identification of an alternative that balances unavoidable impacts with the goals and objectives for the project. Resource impacts associated with each alternative differ greatly in their context, intensity and duration and this balanced approach considers the merit of all resources equally.

Impact topics were defined during the scoping phase of the project and the alternatives were analyzed with respect to them. The topics include cultural resources, natural resources, interpretation and visitor use, socioeconomic environment, land use, access and circulation, air quality, aesthetics and viewsheds, noise, and NPS operations. The existing condition for all of these topics is described in detail in Chapter 3: "Affected Environment", which contains data collected to fully describe all potentially affected resources within the Elkmont Historic District. Using the information collected and documented on the existing condition of the District, potential environmental consequences of each alternative are explained in this chapter in terms of their context, duration, and intensity.

Types of Effects

For some resources, no effect would occur as a result of implementing an alternative. Other effects can be either beneficial or adverse. Effects are evaluated per NEPA guidance as to whether they are direct, indirect or cumulative. NEPA (40 CFR Part 1508) defines each type of effect according to the following definitions:

Direct effect - impacts that are caused by implementation of the proposed alternative at the same time and in the same place as the action

Indirect effect – impacts that are caused by implementation of the proposed alternative, but occur later in time or farther in distance from the proposed action

Cumulative effect – the incremental environmental impact of the action, together with impacts of past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The area of concern is the Park and, in some cases, this area extends to the surrounding region as well.

Duration of Effects
For the purposes of this study, effects are described in terms of their duration as follows:

Short- term effects – impacts that occur during and immediately following project implementation.

Long- term effects- impacts that result from project implementation and directly alter a resource to the extent that the impact is evident following implementation, either for a prolonged period of time or permanently.

Intensity of Effects
Effects are also described in terms of the intensity of the impact on each resource. Intensity of effects ranges from negligible to major for each resource, with negligible representative of little or no effect and major creating an entirely adverse or beneficial impact to the resource. The thresholds for each category are provided in Table 4- 1 for each impact topic.

Section 106 Findings
In addition to describing effects under the NEPA process as discussed above, potential impacts to Cultural Resources must also be identified in terms of their compliance with Section 106 of the National Historic Preservation Act. As described in 36 CFR, the Section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation between the agency official and other parties with an interest in the effects of the undertaking on historic properties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize and mitigate any adverse effects on historic properties. Section 106 effects determinations specified in 36 CFR Part 800 Protection of Historic Properties consist of findings of adverse effect and findings of no adverse effect.

The criteria for effects determinations under Section 106 of the National Historic Preservation Act are described in 36 CFR § 800.5 as follows:

> An undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register.
>
> The agency official, in consultation with the SHPO/THPO, may propose a finding of no adverse effect when the undertaking's effects do not meet the

criteria of adverse effect or the undertaking is modified or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO/THPO to ensure consistency with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines, to avoid adverse effects.

As a result, in order to identify potential effects to cultural resources under Section 106 of the National Historic Preservation Act, as well as NEPA, impact thresholds have been specified for determination of potential effects under both laws (Table 4- 1).

At the end of the effects analysis for each alternative, a summary of all potential effects of implementing the alternative is provided. This information is also included in a series of tables at the end of this chapter to facilitate comparisons between project alternatives.

Table 4- 1: Impact Threshold Definitions

CULTURAL RESOURCES		
Buildings	Negligible	Effect(s) at the lowest level of detection—barely measurable, with no perceptible consequences, either adverse or beneficial. The Section 106 determination of effect would be *no adverse effect*.
	Minor	Adverse effect – impact(s) would alter a feature(s) of the building(s) but would not diminish the overall integrity of the resource(s). The Section 106 determination of effect would be *no adverse effect*. Beneficial effect – stabilization/preservation of features in accordance with *The Secretary's Treatment Standards*. The Section 106 determination of effect would be *no adverse effect*.
	Moderate	Adverse effect – impact(s) would alter a feature(s) of the building(s), diminishing but not destroying the overall integrity of the resource(s). The Section 106 determination of effect would be *adverse effect*. Beneficial impact – rehabilitation of a building(s) in accordance with *The Secretary's Treatment Standards*. The Section 106 determination of effect would be *no adverse effect*.
	Major	Adverse effect – impact(s) would substantially alter the building(s), greatly diminishing or even destroying the overall integrity of the resource(s). The Section 106 determination of effect would be *adverse effect*. Beneficial effect – restoration of a building(s) in accordance with *The Secretary's Treatment Standards*. The Section 106 determination of effect would be *no adverse effect*.
Cultural Landscape	Negligible	Effect(s) at the lowest level of detection—barely measurable, with no perceptible consequences, either adverse or beneficial. The Section 106 determination of effect would be *no adverse effect*.
	Minor	Adverse effect – impact(s) would alter a pattern(s) or feature(s) of the cultural landscape, but would not diminish the overall integrity of the landscape. The Section 106 determination of effect would be *no adverse effect*. Beneficial effect – preservation of cultural landscape patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The Section 106 determination of effect would be *no adverse effect*.
	Moderate	Adverse effect – impact(s) would alter a pattern(s) or feature(s) of the cultural landscape, diminishing but not destroying the overall integrity of the landscape. The Section 106 determination of effect would be *adverse effect*. Beneficial effect – rehabilitation of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* . The Section 106 determination of effect would be *no adverse effect*.
	Major	Adverse effect – impact(s) would substantially alter a pattern(s) or feature(s) of the cultural landscape, greatly diminishing or even destroying the overall integrity of the landscape. The Section 106 determination of effect would be *adverse effect*. Beneficial effect – restoration of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* . The Section 106 determination of effect would be *no adverse effect*.

Table 4- 1: Impact Threshold Definitions (continued)

CULTURAL RESOURCES (continued)		
Archeology	Negligible	Effect to the site(s) is at the lowest level of detection – barely measurable with no perceptible consequences, either adverse or beneficial. The Section 106 determination of effect would be *no adverse effect.*
	Minor	Adverse effect – disturbance of the site(s) results in little, if any, loss of integrity or information potential. The Section 106 determination of effect would be *no adverse effect.* Beneficial effect – Preservation of the site(s) in its natural state. The Section 106 determination of effect would be *no adverse effect.*
	Moderate	Adverse effect – disturbance of the site(s) would not result in substantial loss of integrity or information potential. The Section 106 determination of effect would be *adverse effect.* Beneficial effect – Stabilization of a site(s). The Section 106 determination of effect would be *no adverse effect.*
	Major	Adverse effect – disturbance of the site(s) would result in substantial loss of integrity or information potential. The Section 106 determination of effect would be *adverse effect.* Beneficial effect – Active intervention to preserve the site(s). The Section 106 determination of effect would be *no adverse effect.*
SOILS		
	Negligible	Effects cause no measurable or perceptible changes in soil structure.
	Minor	Effects are measurable or perceptible, but occur over a small area or areas in which soil disturbance has occurred in the past.
	Moderate	Effects are localized and small in size, but cause a permanent change in the soil structure.
	Major	Effects to the soil structure are substantial, highly apparent, and permanent.
BIOTIC COMMUNTIES		
Terrestrial Plant Communities	Negligible	Effects cause no measurable or perceptible changes in plant community size, integrity or continuity in the short-term, and are not predicted to occur in the long- term.
	Minor	Effects on plant communities are measurable or perceptible, create a short- term disruption, but effects are within the natural variability and are localized within a limited spatial scale. The overall viability of the plant community would not be affected and, if left alone, would recover.
	Moderate	The severity and duration of effects to plant communities are expected to be outside the natural variability for short periods of time, but may cause a long- term change within the natural variability of plant community diversity or relative cover of native species. Alterations to a G1 – G3 ranked community would occur on a limited spatial scale and are within natural variability.
	Major	The severity and duration of impacts to plant communities are expected to be outside the natural variability for short to long periods of time or permanent. Impacts may cause a long- term or permanent change in the natural variability of plant community diversity or relative cover of native species. Included are alterations that result in degradation or loss of a G1 – G3 ranked community and those that would occur outside natural variability.

Table 4- 1: Impact Threshold Definitions (continued)

BIOTIC COMMUNTIES (continued)		
Aquatic Communities	Negligible	Effects cause no measurable or only slightly perceptible changes in aquatic community structure, function and composition.
	Minor	Effects (beneficial or adverse) are detectible, but slight. If adverse, the overall viability of the aquatic community would not be affected and, if left alone, would recover.
	Moderate	Effects (beneficial or adverse) are apparent and would cause long- term changes in aquatic community structure, function and composition.
	Major	Effects (beneficial or adverse) would be substantial and severe, highly visible and permanent.
Wetlands	Negligible	Effects cause no measurable or perceptible changes in wetland size, integrity, continuity or function.
	Minor	Effects are measurable or perceptible and localized within a relatively small area. The overall viability and function of the wetland would not be affected.
	Moderate	Effects would cause a long- term change in the wetland in terms of native species diversity, soil structure, hydrology or primary functions and values.
	Major	Effects on the wetlands would be substantial, highly visible within the District, and permanent; wetland would be filled or obliterated.
Floodplains	Negligible	Effects cause no measurable or perceptible changes in floodplain size, integrity, continuity or function
	Minor	Effects are measurable or perceptible and localized within a relatively small area. Floodplain storage capacity would not be affected
	Moderate	Effects would cause a long- term change in the floodplain in terms of primary functions and values
	Major	Effects on floodplains would be substantial, highly visible within the District, and permanent; floodplain storage capacity would be changed; floodplain function would be permanently altered
Threatened and Endangered Species	Negligible	No effect; The action would not affect a listed species or its designated critical habitat.
	Minor	Not likely to adversely affect; impacts on listed species are expected to be insignificant or completely beneficial. Beneficial impacts are contemporaneous positive effects without any adverse effects on the species.
	Moderate	Likely to adversely affect; impacts on listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is discountable, insignificant or completely beneficial.
	Major	Likely to adversely affect; An adverse impact on a listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant or beneficial.

Table 4- 1: Impact Threshold Definitions (continued)

BIOTIC COMMUNTIES (continued)		
Rare and Sensitive Species	Negligible	No impacts; no rare or sensitive species are present.
	Minor	Effects to rare or sensitive species, adverse or beneficial, are detectable
	Moderate	May impact individuals, but is not likely to cause a trend to federal listing or loss of viability; rare or sensitive species are present and project is occurring during vulnerable life stages (e.g. flowering, hibernation, etc.).
	Major	Likely to cause a trend towards federal listing or a loss of viability; rare or sensitive species are present in high numbers and project implementation is occurring during vulnerable life stages.
Water Quality	Negligible	Effects, beneficial or adverse, (chemical, physical or biological effects) are not detectable and water quality remains well below limits of water quality standards and/or historical ambient or desired water quality conditions.
	Minor	Effects, beneficial or adverse, (chemical, physical or biological effects) are detectable, but water quality remains well within or below limits of water quality standards and/or historical ambient or desired water quality conditions.
	Moderate	Effects, beneficial or adverse, (chemical, physical or biological effects) are detectable and water quality remains within or below limits of water quality standards, but historical baseline or desired water quality conditions are being altered on a short- term basis.
	Major	Adverse effects (chemical, physical or biological effects) are detectable, and significantly and persistently alter historical baseline or desired water quality conditions; Beneficial impacts eliminate sources of contamination or sedimentation of surface waters on a permanent basis.
AIR QUALITY		
	Negligible	Net decrease in NOx and VOCs emissions compared to current levels or no measurable changes to current emissions in non- attainment areas following project implementation.
	Minor	Emissions decrease (beneficial) or increase (adverse) over the existing condition. If adverse, one or both NOx and VOCs emissions increase by 1 to 5 tons per year following project implementation in non- attainment areas.
	Moderate	Beneficial: Emissions of NOx and VOCs decrease permanently by 1 to 5 tons per year over the existing condition, aiding the state's ability to meet national ambient air quality standards. Adverse: Either NOx or VOCs emissions increase following project implementation in non- attainment areas by more than 5 tons per year from current levels.
	Major	Beneficial: Permanent decreases greater than 5 tons per year in emissions of NOx and VOCs occur. Adverse: Permanent increases greater than 5 tons per year in emissions of NOx and VOCs occur as a result of project implementation; these increases either directly, indirectly, or cumulatively interfere with the state's ability to meet national ambient air quality standards in non- attainment areas.

Table 4- 1: Impact Threshold Definitions (continued)

INTERPRETATION AND VISITOR USE		
Visitor Experience and Visitor Facilities	Negligible	No effects or only temporary effects are anticipated on the visitor experience. Little noticeable change in visitor experience (or in the defined indicators of visitor experience, such as visitation numbers) or behavior. The impact on visitor safety is not measurable or perceptible.
	Minor	Desired visitor experience is changed, but without appreciably limiting or enhancing critical characteristics of the experience. Visitor satisfaction remains stable. Impacts on visitor safety may be realized through a minor increase or decrease in the potential for visitor conflicts in potential accident areas (traffic accidents, hazard tree effects, etc.)
	Moderate	Critical characteristics of the desired experience are changed or the number of participants engaging in an activity is changed (beneficial or adverse). The potential impact on visitor safety is sufficient to either remove existing potential hazards or to create the potential for additional visitor conflicts or accidents. If adverse, visitor satisfaction declines.
	Major	Potential effects would either greatly enhance or detract from multiple critical characteristics of the desired visitor experience or greatly reduce or increase participation in visitor activities.
SOCIOECONOMIC ENVIRONMENT		
Land Use	Negligible	No effects occur or the effects on land use are at or below the level of detection.
	Minor	Effects (beneficial or adverse) to existing land use are detectable, short- or long- term. User conflicts are not anticipated.
	Moderate	Existing land uses are expanded to include other allowable uses under the transportation and general Park development subzones. If beneficial, no user conflicts would be anticipated. If adverse, user conflicts are expected to arise due to conflicting use of resources or degradation of resources due to intensity of use.
	Major	Existing land uses would be expanded to include other allowable uses under the transportation and general Park development subzones, as well as introduction of other uses not included in these subzones. If beneficial, no user conflicts would be anticipated. If adverse, user conflicts are expected to arise due to conflicting use of resources or degradation of resources due to intensity of use.
Access and Circulation	Negligible	No changes in access or internal circulation result; visitation, if altered, would not affect internal circulation.
	Minor	Changes to internal circulation are required to implement the alternative. Includes beneficial impacts (such as repair of existing roadways and parking areas).
	Moderate	Changes to internal circulation and access restrictions are required to implement the alternative. Some changes in circulation and access features are required to implement the alternative (such as construction of pull off parking for exhibits and repair of existing roadways). Associated operation and maintenance costs would increase.
	Major	Considerable changes to the internal circulation and access restrictions are required to implement the alternative. Changes include addition of parking areas across the District, incorporation of features to ensure pedestrian safety; associated operation and maintenance costs would increase.

Table 4- 1: Impact Threshold Definitions (continued)

VIEWSHED		
	Negligible	The visual quality of the landscape would not be affected or, if effects did occur, they would be at or below the level of detection, would be short- term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the visitor experience.
	Minor	Effects to the visual quality of the landscape would be detectable, although the effects would be localized and would be small and of little consequence to the visitor experience.
	Moderate	Effects to the visual quality of the landscape would be readily detectable, long- term and localized, with consequences at the District level.
	Major	Effects to the visual quality of the landscape would be obvious, long- term, and would have substantial consequences to the visitor experience in the District.
SOUNDSCAPE		
	Negligible	The natural sound environment would not be affected or the effects would be at or below the level of detection, would be short- term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the visitor experience or to biological resources.
	Minor	Effects to the natural sound environment would be detectable, although the effects would be short- term, localized and would be small and of little consequence to the visitor experience or to biological resources.
	Moderate	Effects to the natural sound environment would be readily detectable, long- term and localized, with consequences at the local (District) level.
	Major	Effects to the natural sound environment would be obvious, long- term, and would have substantial consequences to the visitor experience or to biological resources in the region.
NPS OPERATIONS		
	Negligible	Park operations would not be affected or the effect would be at or below the level of detection.
	Minor	The effects on NPS operations would be detectable and likely short- term, but would be of a magnitude that would not have an appreciable effect on existing operations.
	Moderate	The effects on NPS operations would be apparent, long- term, and would result in a substantial change in Park operations in a manner noticeable to staff and to the public.
	Major	The effects on NPS operations would be readily apparent, long- term, and would result in a substantial change in Park operations in a manner noticeable to the staff and the public. The effects would create a condition considerably different than the existing condition and would require additional Park staff, funding or other resources.

4.2 Impacts of No Action Alternative

The No Action Alternative entails the removal of all historic buildings in the Elkmont Historic District, either by mechanical means or by hand. This action would be taken in accordance with the management direction provided in the 1982 General Management Plan. Foundations, chimneys, stone walls, and other cultural landscape features would remain in place wherever they would not pose a safety hazard to visitors. In addition to allowing vegetation to return to a natural state where buildings are removed, the Park would continue to implement its current natural resource management activities. The amount of visitation under the No Action Alternative is not expected to change as a result of project implementation. There would be no changes to existing access, circulation or to the current level of general maintenance of existing infrastructure.

4.2.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

The No Action Alternative proposes removal of all historic buildings. These buildings provide a dominant definition to the cultural landscape and removal of these elements would significantly alter the cultural landscape (mainly the "spatial organization", and "buildings and structures" characteristics; see Table 3- 3). Other cultural landscape features, such as historic plantings, stone walls, and chimneys, would remain. This action would cause direct, major, adverse effects on the National Register of Historic Places-listed District and its cultural landscape, as would the change in use and setting (36 CFR 800.5[a][1] and [2]). These effects would be permanent. The use and setting of the District would change from that of a built, historic area to a forested area. There would be no indirect effects on the buildings or cultural landscape in the District.

Archeological Resources

The potential for the No Action Alternative to impact archeological resources depends on the level, extent and location of ground- disturbing activities. Since this alternative proposes removal of all the historic buildings in the District, there is potential to impact archeological resources at several locations. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis. The proper execution of avoidance or protective strategies could ensure that no effect on archeological resources would occur.

The areas where such resources could potentially be adversely affected include one locus where a significant resource has been documented, four loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at 12 loci. Since eligibility for listing on the National Register of Historic Places has not been determined for most of the resources, and since no beneficial effects would be recognized, the project effects are uniformly categorized as potential adverse effects. If impacts occurred, they would be direct, adverse, permanent, and could be major. Table 4- 2 at the end of this chapter provides a summary of the known or potential effects to each archeological resource for the No Action Alternative and the other project alternatives.

Estimates of the potential costs associated with additional archeological survey, evaluation, and site monitoring for this and other alternatives have been developed and are presented in Table C- 5 of Appendix C. In addition, measures have been recommended to minimize the potential for adverse effects to archeological resources during project implementation. Detailed recommendations for avoiding potential archeological impacts in the area of each historical building or group of buildings are provided as part of site- specific recommendations summarized in Appendix E, Table E-1. NPS would coordinate with the State Historic Preservation Office regarding appropriate response actions and mitigation measures. The exact type(s) and cost of the mitigation cannot be calculated at this time.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, the removal of buildings and change in the use and setting of the District would result in a determination of adverse effect. Implementation of this alternative would remove all contributing buildings within the historic district, and its integrity would be lost.

As discussed under the previous archeology discussion, the potential effects to archeological resources under the No Action Alternative could also result in a determination of adverse effect under Section 106 if the proper avoidance or protective strategies for archeological resources that could be potentially impacted are not implemented.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type(s) and cost of the mitigation cannot be calculated at this time.

4.2.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of the No Action Alternative would result primarily from ground- disturbing activities. The No Action Alternative proposes removal of all historic buildings and may include seeding to reestablish vegetation on former building sites and other areas disturbed during project implementation. Soil erosion may occur in these areas and an immediate protective cover would help prevent erosion. Otherwise, native plants would be allowed to regenerate naturally in this alternative. Impacts generally include negligible, short- term, adverse effects and long-term, beneficial effects, as discussed below.

4.2.2.1 Soils

Whenever ground- disturbing activities take place there is a possibility of increased erosion. Erosion increases as runoff rates increase in areas where vegetation has been removed or where soils have been compacted by heavy machinery. The No Action Alternative proposes removal of all of the historic buildings in the District. During project implementation, soils would be disturbed if access by heavy machinery or other equipment is necessary for removal of the buildings and structures. Although the direct, adverse effects on soils would be widespread across the District, they would occur during project implementation and would be negligible and short- term. These effects would be mitigated somewhat by protocols established by the Park (see Section 2.2.1),

such as permitting the use of low ground pressure equipment only (except for hauling on existing roadways) and removal of buildings by hand in sensitive areas. In addition, all areas where there has been ground disturbance would be seeded with native species following project completion.

The indirect effect on soils associated with implementing the No Action Alternative would be long- term, major and beneficial, primarily because a large area of impervious surfaces (approximately 2.4 acres; Table 4- 3) would be eliminated following removal of all 74 buildings. The soils underlying the buildings have various infiltration capacities, depending on the soil structure and extent of prior compaction. While the permeability of soils underneath the buildings cannot be estimated accurately without extensive sampling, it is reasonable to assume that these soils maintain a higher infiltration capacity than man- made buildings, parking areas and other highly impermeable surfaces. Exceptions to this increased infiltration capacity would include those areas containing shallow or exposed bedrock. Increased infiltration and associated decreases in runoff and soil erosion would provide major, long- term, beneficial effects on soils and to adjacent waterways. Once vegetation is restored in areas formerly occupied by buildings, the plants would provide additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems. No cumulative effects on soils are anticipated under the No Action Alternative.

4.2.2.2 Biotic Communities

4.2.2.2.1 Terrestrial Plant Communities

There would be direct, short- term, negligible, adverse effects to biotic communities during implementation of the No Action Alternative. These effects would occur during project implementation, primarily because gaining access to buildings slated for removal and hauling building materials off- site would require the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable damage to tree limbs and crushing of herbaceous vegetation.

The overall indirect effect to biotic communities in the District would be major, long- term, and beneficial, resulting from an increase in wildlife habitat and improvements to the quality of existing habitat. The plant community types found in the District have become established primarily due to variations in topography, slope, aspect, soil type, proximity to surface water and the effects of prior disturbance. Over time, the sites formerly occupied by buildings would provide opportunities for forest regeneration and would gradually enlarge the existing plant communities of the District.

In the Wonderland Club, there are primarily two forest types that would have the opportunity to expand. They include Appalachian montane oak- hickory forest and eastern white pine successional forest, dominated by eastern hemlock. In Millionaire's Row, the floodplain contains Appalachian montane oak- hickory forest, early successional Appalachian hardwood dominated by tulip poplar, and southern Appalachian cove forest. The occurrence of large sycamore trees in

portions of the Little River and tributary floodplains indicates that these floodplain areas contain the heavily impacted montane alluvial forest, a community that is globally imperiled. Tributaries to the Little River outside of the floodplain may have many of the same overstory species and may be classified as the same community type, but they typically lack the biological and structural diversity of the floodplain forest located within the floodplain of larger rivers and streams. Removal of buildings throughout floodplain areas and cessation of chronic disturbance would allow for gradual succession back to this forest type.

In Society Hill and Daisy Town, forested areas have been considerably disturbed by past human activity. Plant communities present include early successional Appalachian hardwood forest dominated by tulip tree and red maple, with smaller areas of Appalachian montane oak- hickory, southern Appalachian cove, chestnut oak, and Virginia pine successional forest communities.

Removal of buildings throughout the District would eliminate the need to perform hazard tree removal beyond that which is done adjacent to trails and within the Elkmont Campground. Every year, the NPS removes approximately 600 hazard trees from campgrounds throughout the Park to provide for visitor safety. Throughout the remainder of the District, most of the hazard trees surrounding the historic buildings have not been removed since the grounds and buildings have been closed to the public. Implementation of the No Action Alternative would eliminate the need for hazard tree management above that which is currently performed in the District and would eventually allow forests to reach the old growth stage of development.

Within the study area, the globally imperiled montane alluvial forest would have an opportunity to expand up to 22 acres (9 hectares) throughout floodplain and wetland areas (see Table 4- 3) once the buildings are removed and hazard tree management is no longer necessary in these areas.

4.2.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of the No Action Alternative. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and beneficial, resulting from an increase in the vegetation in abutting plant communities due to increased infiltration and associated decreases in runoff and soil erosion. Once vegetation is restored in areas formerly occupied by buildings, the plants would provide protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems.

4.2.2.3 Threatened, Endangered, Rare and Sensitive Species

The No Action Alternative would have no direct effects on federally- listed threatened and endangered species since none of these species are known to occur within the proposed project implementation area. However, there may be indirect, minor, beneficial effects to several species due to habitat improvements. Removal of the buildings and revegetation of disturbed areas would eventually expand and improve the wildlife habitat in the District. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*) occur within the District. Implementation of the No Action Alternative provides the potential for existing populations of these species to expand into revegetated areas. Similar benefits would also be provided to state- listed species for which the District contains potential habitat. Those species include running bittercress, rough hawkweed, Fraser's yellow loosestrife, broadleaf bunchflower, yellow nodding lady's tresses, peregrine falcon, common raven, North American river otter, longhead darter, and northern pine snake. Site- specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the Park would consult with the U.S. Fish and Wildlife Service and the state of Tennessee to determine measures to avoid, minimize, or mitigate adverse effects on the species.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*) is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall located within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be negligible. Following project implementation, expansion of the available area for infiltration should benefit water quality, indirectly providing minor benefits to aquatic species downstream such as the hellbender.

Although it is not a federally or state- listed species, or considered rare, the welfare of the synchronous firefly species that has been observed in the District is of concern to the NPS and the public who visit the District annually to view this species. The synchronous firefly population at Elkmont would likely experience a short- term, moderate benefit from expanded habitat as well. Since most of the buildings are located near streams or rivers, their removal could increase moist grassy areas where synchronous fireflies are often found. The firefly has also been observed in cleared areas and grassy areas along roadways in the District. Over the long term, without management to sustain those herbaceous habitats, woody vegetation will eventually encroach upon the area, possibly affecting the synchronism of this species. At this time, the role of synchrony in the ecology of this species is poorly understood, so it is difficult to quantify potential impacts.

4.2.2.4 Wetlands

Short- term, direct, minor adverse effects to wetlands would occur during project implementation as a result of disturbance created by heavy equipment in wetlands within Millionaire's Row. Although protocols have been established to avoid the potential for impacts to sensitive areas, the environment of the wetlands along Bearwallow Branch is

not suitable for machine traffic or even heavy pedestrian traffic due to saturated soil conditions. Although these wetlands would be disturbed during project implementation, this disturbance would be temporary and further minimized through seeding of native species over disturbed soils. However, wetlands may indirectly experience long- term, moderate, beneficial effects following removal of adjacent buildings. The environment surrounding residential buildings is subject to runoff from impervious surfaces, and has experienced soil compaction, deposition of petrochemicals from automobiles, heating and other household uses, planting of non- native species and vegetation management practices not consistent with those required to propagate native plant communities. These types of chronic disturbances in the past resulted in loss of native plant diversity and subsequent degradation of wildlife habitat. Therefore, wetlands that abut residential properties, such as those found in Millionaire's Row, would benefit from elimination of these chronic disturbances.

In addition, implementing the No Action Alternative would provide indirect, long- term benefits to wetlands by improving several wetland functions and values, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, fish/shellfish habitat and recreation. Increasing the wildlife habitat in areas adjacent to wetlands would benefit the habitat function by providing abutting upland buffer areas and allowing for increased diversity in both flora and fauna. Wildlife species that migrate into areas that were formerly occupied by buildings would be able to utilize wetland habitat nearby as well. The aesthetic/visual quality value of the wetland would be improved by seeding former building sites with native plant species. Removal of impervious surfaces would allow greater infiltration adjacent to wetlands. Both the water quality and, subsequently, the fish and shellfish habitat functions, could potentially improve due to the increased area available for infiltration, reduction in impervious surfaces, and subsequent decrease in sedimentation of surface waters. The recreational value of the wetlands potentially would also increase because removal of the buildings would provide more opportunity for recreation such as wildlife watching, wildflower identification, fishing, hiking and a variety of activities focused on observation and appreciation of biotic communities.

4.2.2.5 Water Quality

Effects to water quality resulting from implementation of the No Action Alternative would consist of short- term, direct, negligible, adverse effects during project implementation and minor, indirect and long- term beneficial effects following project completion. Because this alternative proposes removal of all historic buildings across all areas of the District, former building sites would experience ground disturbance from heavy equipment and movement of vehicles off of existing roadways to access the buildings and transport materials out of the District. Although Best Management Practices (BMPs) such as installation of silt fence would be followed, there would still be potential for short- term, negligible adverse effects to water quality from erosion and sedimentation of surface waters that could occur during project implementation. However, once the areas have been seeded and vegetation becomes established, approximately 2.41 acres of impervious surfaces would be eliminated, allowing for additional infiltration. Restoration of vegetation on exposed areas would create minor, long- term, beneficial effects by filtering out nutrients and sediments in surface water runoff that currently enters the District's waterways.

The USEPA maintains a list of constituents that are found in typical roadway and parking area rainfall runoff (Table 4- 4). The list provides a wide range of concentrations or typical loading for constituents such as heavy metals and petrochemicals. This range is due to the variables associated with the physical size and shape of typical roadway and parking area surfaces as well as their surface material, slope and vehicle density. Total annual rainfall runoff from impervious surfaces such as parking lots and roadways has been estimated for all alternatives and is provided at the end of this chapter in Table 4- 5. As the table indicates, both roadway and parking lot surface water runoff are expected to remain the same as the existing condition if the No Action Alternative is implemented. Therefore, roadway runoff would not affect water quality over and above the existing condition if the No Action Alternative was implemented.

4.2.2.6 Floodplains

There would be no direct effects to the 100- year floodplain of the Little River or its tributaries as a result of implementing the No Action Alternative. Long- term, indirect, moderate beneficial effects to these floodplains would be experienced through removal of buildings currently in and adjacent to the 100- year floodplain of Bearwallow Branch and the Little River. An increase in the area (3,520 sf) available for infiltration and flood storage would be a direct benefit due to removal of three buildings in the 100- year floodplain, (Miller (#46), Faust (#47), and Faust garage (#47A)), and their associated impervious surfaces. Another long- term, major, indirect benefit would be an increase in the area of associated plant communities, such as the Appalachian Montane Oak-Hickory Forest. In addition, the Appalachian Montane Alluvial Forest is expected to regenerate at former building sites and in the adjacent floodplain in the absence of disturbance from residential use of the area. Additional indirect, long- term, minor benefits would be provided because removal of buildings within and adjacent to floodplains would eliminate future ground disturbance and soil compaction associated with residential use.

4.2.2.7 Air Quality

Visitation to the District is not expected to change as a result of implementing the No Action Alternative. Although there would be a temporary increase in emissions due to operation of equipment, direct adverse effects would be short- term and negligible, occurring only during project implementation. These effects could be minimized by reducing equipment idling times, ensuring that all construction equipment is in good operating condition, and by performing removal during the time of year when ozone is least likely to form (April to September).

There would be no direct or indirect effects to air quality following project implementation and emissions would remain the same as the existing condition. Based on a busy Saturday in summer, the emissions of the key air pollutants from the No Action Alternative in 2015 are projected to be 50.37 tons per year of NOx and 72.64 tons per year of VOCs. These figures represent “worst case” scenario concentrations, and may be experienced on only a few days per year. Table 4- 8 at the end of this chapter provides a comparison of estimated post- construction emissions for each project alternative.

4.2.3 Impacts on Interpretation and Visitor Use

Implementation of the No Action Alternative would create no effects on interpretation and visitor use. The number of visitors to the District is not expected to change and there would be no change in current interpretive programs conducted in the District.

4.2.3.1 Visitor Experience

Visitor experience would change as a result of implementing the No Action Alternative. A number of variables affect how visitors perceive their experience at Elkmont Historic District, including expectations, past experiences, the number of other visitors they encounter, their experience with nature, the condition of visitor facilities and the quality of the programs in which they participate. Implementation of the No Action Alternative would have indirect, long- term, major, beneficial effects by removing the buildings from the landscape because of their current condition.

Currently, the buildings and associated grounds are closed to the public. However, the District allows for multiple opportunities to view the extant cultural landscape, including the buildings and smaller- scale elements, from existing roadways. If the No Action Alternative were implemented, the appearance of the District's cultural landscape would change as a result of building removal. Interpretive opportunities would include ranger-led activities in the District, on- going publications and trail use, as well as examination of remaining features (stone walls, foundations, chimneys and other remnants of the historic buildings) and the remaining cultural landscape features such as the axial views along roads and streams that are not building- dependent for their setting but help to define the District.

4.2.3.2 Visitor Facilities

Visitor facilities in the Elkmont Historic District consist of the Elkmont Campground, parking areas and trail access. Implementation of the No Action Alternative would occur when the campground is closed and during the time of year when visitation is lowest. However, alternate access to trails may have to be identified prior to project implementation so that some areas could be closed to provide for visitor safety as equipment moves through the area. The adverse effect of restricted access would be short- term (occurring only during project implementation) and negligible.

4.2.4 Impacts on Socioeconomic Environment

The No Action Alternative would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.2.4.1 Population and Environment

The No Action Alternative would have no direct, indirect or cumulative effect on local or regional populations.

4.2.4.2 Land Use

The 1982 General Management Plan identifies two land use subzones within Elkmont Historic District, transportation and development. The transportation subzone consists primarily of public roadway corridors. The development subzone encompasses regions that include facilities for picnicking, camping, public and staff accommodations, historical and natural resource interpretation, parking, and park operation and maintenance (NPS 1982). Implementation of the No Action Alternative would indirectly

result in long- term, minor beneficial effects to land use. These effects would be achieved through opening the grounds to the public following removal of buildings and structures.

The eventual use of the District would remain consistent with the NPS land use zone designations in the 1982 General Management Plan. Implementation of the No Action Alternative would continue to allow for use of public roadway corridors, picnicking and camping at the Elkmont Campground, historical and natural resource interpretation through NPS programs and printed material, and accommodations at the existing quarters for Park staff.

4.2.4.3 Access and Circulation
During implementation, the No Action Alternative would have negligible, adverse, short- term effects on access and circulation. Although the buildings and grounds would remain closed during project implementation to prevent safety hazards to visitors, alternate access to trails in the area would be provided. To avoid impacting campground visitors, project activities would take place when the campground is closed (December to February). These measures would reduce the potential for adverse effects to existing access and circulation and would avoid disrupting circulation while the campground is open. During removal of the buildings, construction vehicles would add to the internal trips within the District and could cause minor delays.

Once project activities are completed, visitation is not expected to increase and the internal circulation is expected to remain consistent with that of the existing condition (see Tables 4- 6 and 4- 7 at the end of this chapter for a comparison of circulation between all alternatives). As a result, there would be no indirect effects on access or circulation in the District.

4.2.5 Impacts on Other Resources

4.2.5.1 Viewshed
Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the condition of the buildings.

Because the General Management Plan is the existing management direction for Elkmont, the No Action Alternative establishes the baseline for this environmental analysis and the associated visual analysis. The buildings within the study area are considered obstructions to the natural viewshed that would be removed if the General Management Plan (this alternative) was implemented. All buildings would be removed under this alternative thereby restoring the natural viewshed of the study area. Permanent, direct, major, beneficial effects would be realized by removing 74 buildings from the landscape. Removal of these features are shown in photos 3 through 6A in Appendix D that depict the existing views of a variety of historic buildings and simulations of the potential views following removal of these buildings. In addition to

removing the buildings and restoring natural conditions, the No Action Alternative proposes to retain foundations, rock walls and other cultural landscape components that obstruct views of the District's natural resources. Direct, adverse impacts to the District viewshed are expected to occur during implementation of the No Action Alternative because of the presence of machinery and ground disturbance, but these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be long- term, major and beneficial under the No Action Alternative due to removal of buildings and structures. Composite viewshed areas (Figures 7, 8 and 9, Appendix D) would also be beneficially affected by building removal with regard to the area that is visible from the transportation corridors.

4.2.5.2 Soundscape

Direct, short- term, minor adverse effects to the soundscape are expected during implementation of the No Action Alternative. The high noise level of combustion-powered equipment (usually diesel) is expected to be the primary contributor to the sound level and can interfere with the ability of individuals near the work site and passersby to hear speech. Overall, noise created during project implementation would be relatively short in duration and restricted to daytime hours and during the time of year in which visitation is the lowest. For an area such as Elkmont Historic District, located in a National Park, the appropriate noise abatement category is B with an Equivalent Sound Level (Leq) of 67 A- weighted decibels (dBA). Category B applies to areas such as picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals (see Section 3.5.2 for a detailed explanation of noise abatement categories and criteria). Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 to 100 dBA. The major sources of noise during project implementation may include that created by removal of buildings and hauling materials. Following project completion, natural conditions away from the influence of rivers or creeks with little wind would likely continue to result in sound levels in the 35 dBA range. Projected average and maximum noise levels for all alternatives are provided in Table 4- 9.

No long- term direct or indirect effects on noise are expected to occur as a result of implementing the No Action Alternative. It is expected that, following implementation of the No Action Alternative, future noise levels would likely be in the range of 50 to 60 dBA, with levels in areas that would revert to natural conditions at approximately 35 dBA. Since projected noise levels would remain the same as the existing condition, the No Action Alternative would have no effect on noise levels in the District once construction activities are completed.

4.2.6 Impacts on NPS Operations

Although the No Action Alternative would have no direct effects on NPS operations following project implementation, it would have indirect major beneficial effects on NPS operations due to removal of the Elkmont buildings. These effects would be permanent, and achieved primarily through elimination of the resources necessary to monitor and maintain the buildings. Currently, the historic buildings within the District are in various stages of disrepair. The NPS makes necessary repairs to the buildings on a regular basis.

In addition, the buildings have the potential to contain a variety of hazards, such as hanta virus, histoplasmosis, and lead- based paint.

General maintenance (litter pick- up, mowing, vegetation management, etc.) and some law enforcement would still be required. The NPS routinely removes hazard and fallen trees adjacent to roads and paths. Many trees have fallen directly on the buildings, requiring removal of the tree, as well as additional measures to repair damage to the buildings. Some of the expenditures required for hazard tree management adjacent to the buildings would be eliminated as buildings are removed; indirectly creating a permanent, major benefit for NPS operations through a reduction in costs associated with staff time and equipment needs. Removal of buildings would not completely eliminate the need for hazard tree management, but would reduce NPS expenditures currently used to repair the buildings. Even if buildings are removed, the NPS must still manage hazard trees to provide for visitor safety. In moist cove forest communities, such as those found in the District, research has shown that between 1.0 and 1.5 percent of canopy trees fail on an annual basis (Runkle 1982). Therefore, hazard trees adjacent to exhibits, trails and roadways are also removed to reduce the possibility that visitors could be harmed by falling trees. This practice would continue at its current level.

4.2.7 Cumulative Effects

Long- term, major, beneficial cumulative effects to biotic communities, potential habitat for threatened, endangered, rare and sensitive species, wetlands, water quality, and floodplains would be provided through implementation of the No Action Alternative. These effects would result from removal of historic buildings throughout the District. Reestablishment of native plant communities at the former building sites would provide multiple benefits to aquatic, wetland and terrestrial environments through soil stabilization and reduction in erosion and sedimentation of surface waters. In addition, implementation of the No Action Alternative would provide an opportunity for reestablishment of areas of the globally imperiled montane alluvial forest, helping to ensure the sustainability of this rare community.

The Little River is one of only six Outstanding National Resource Waters in the state of Tennessee. This designation is indicative of the pristine nature and excellent water quality in the river. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from parking area runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Reduction of runoff and elimination of erosion help to lower the potential for contaminants to enter the river, further protecting it from degradation.

Revegetation of native plant communities not only increases total vegetation cover, but also increases the area of available habitat for a variety of fauna. Invasive, non- native plant species thrive in disturbance areas. Failing to continue a comprehensive, invasive, non- native species management program at the District could, over time, result in the spread of those species into other areas of the Park adding exponentially to the existing adverse effects that invasive species have on the Park's botanical diversity.

The permanent, major, adverse effect on cultural resources in the No Action Alternative is significant in a cumulative sense as well. While the Park contains a variety of historic

buildings and cultural landscape components, the District buildings represent the only remaining settlement of its type and time period in the Park. Other resort properties representing this time period, such as hotels and lodges inside the Park, and hotel and cabin communities outside the Park, have either been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would contribute to the cumulative loss of buildings from this period in southern Appalachian history. There are no cumulative effects to other resources resulting from activities proposed in the No Action Alternative when combined with effects resulting from project activities and foreseeable effects caused by other related undertakings.

4.2.8 Conclusion

Implementation of the No Action Alternative would result in maintenance and / or enhancement of the long- term productivity of many of the natural resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, and water quality. In general, the overall long- term productivity of all biotic resources would be benefited by the increase in land available for restoration of native plant communities. Removal of buildings and structures throughout the District would also increase the area available for reestablishment of the globally imperiled montane alluvial forest. In addition, restored vegetation adjacent to floodplains, wetland and tributaries would further protect water quality of the Little River, an Outstanding National Resource Water. Visual quality, aesthetics and NPS operations would also benefit from the No Action Alternative due to the removal of buildings that currently degrade visual quality and require NPS staff and funding to maintain and stabilize. Opening the grounds following removal of the buildings would provide minor benefits to land use as well.

However, irretrievable commitments of resources would result if the No Action Alternative was implemented. These commitments would be created primarily by removal of the historic buildings within the District. This loss of cultural resources would significantly alter the characteristics of the Elkmont Historic District and this major adverse effect would be permanent. There is also potential for irreversible impacts to archeological resources as a result of implementation of this alternative, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures.

Unavoidable adverse impacts associated with implementing the No Action Alternative are primarily direct, short- term, and negligible and would affect soils, biotic communities, noise, air quality, visitor experience, visitor use, access and circulation, and aesthetics and viewsheds. These effects would result from the disturbance created by construction operations and would be restricted to the project implementation period.

4.3 Impacts of Alternative A

Alternative A entails the removal of all historic buildings in the District, either by mechanical means or by hand. Foundations, chimneys, stone walls, and other cultural landscape features would be removed above ground level. However, features that would require considerable ground disturbance to be removed would be left in place. These actions would be followed by active restoration of native plant communities and development of a comprehensive invasive, non- native plant species monitoring and management plan. This plan would supplement the invasive, non- native species management already occurring in the District and would include an inventory of plant communities and allocation of resources for long- term implementation of the plan. Visitation as a result of implementing Alternative A is not expected to change measurably and current recreational activities in the District would continue to occur. In addition to the active restoration of native plant communities, the Park would continue to implement its current natural resource management activities. New exhibits are proposed under this alternative, including one discussing the natural history of synchronous fireflies and another presenting the history of the Town of Elkmont. The Elkmont Nature Trail brochure would be updated to include natural and cultural history information.

4.3.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

The historic buildings in the Elkmont Historic District would be removed under Alternative A. This action would constitute a direct, permanent, major, adverse effect on the National Register- listed District and its cultural landscape, as would the change in use and setting (36 CFR 800.5[a][1] and [2]). The use and setting of the District would change from that of a built, historic area to an actively restored natural area. Most of the landscape characteristics and features ("spatial organization", "topography and vegetation", "buildings and structures", and "small- scale features"; see Table 3- 3) would experience permanent, major, adverse effects, principally because of the removal of all of the historic buildings from the District and many of the surviving small- scale features. There would be no indirect effects on the District's cultural landscape.

Several components of this alternative would provide direct, long- term, minor benefits to cultural resources. Some cultural landscape characteristics and features, including the axial views from the roadways and streams, and a number of small- scale features such as the footbridge over Bearwallow Branch would be retained. In addition, cultural resource information on Elkmont would be added to the Elkmont Nature Trail brochure and an exhibit on the history of the Town of Elkmont would be installed.

Archeological Resources

As with all alternatives, the potential for Alternative A to impact archeological resources depends on the level, extent and location of ground- disturbing activities. Since Alternative A proposes removal of all the buildings in the District, there is potential to impact archeological resources, but the potential is less than those alternatives that require installation of new sewer lines, water lines or parking lots. All impacts would be direct, permanent, adverse, and could be major. The areas where archeological resources could potentially be adversely affected include one locus where a significant resource has been documented, four loci where potentially significant resources have

been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at 12 loci. These potential impacts are identical to those for the No Action Alternative. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis. The proper execution of avoidance or protective strategies could ensure that no effect on archeological resources would occur.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, removal of buildings and the majority of the cultural landscape characteristics and features, along with the change in the use and setting of the District, would result in a determination of adverse effect. Implementation of this alternative would remove all contributing buildings within the historic district, and its integrity would be lost.

As discussed under the previous archeology discussion, the potential effects to archeological resources under Alternative A could also result in a determination of adverse effect if the proper avoidance or protective strategies for archeological resources are not implemented.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type(s) and cost of the mitigation cannot be calculated at this time.

4.3.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative A would be created primarily from ground- disturbing activities and restoration of native plant communities. Alternative A proposes removal of all historic buildings, restoration of areas where there has been ground disturbance and implementation of an annual management plan to control invasive, non- native species and improve wildlife habitat. Impacts would generally include short- term, minor, adverse effects during and shortly following construction, and long- term, beneficial effects. These effects are discussed below for each natural resource.

4.3.2.1 Soils

This alternative proposes removal of 74 buildings in the District. Although there would be no excavation to remove buried foundations and other buried features, those components would be removed if removal can be accomplished without causing additional ground disturbance. The only grading necessary would be that required to blend the topography of the former building sites into the surrounding landscape. For example, a stone pier or above- ground foundation might be removed, as would other surface features, but excavation to remove the rock walls lining the road through Daisy Town would not be undertaken.

Whenever ground- disturbing activities take place there is potential for soil compaction and increased erosion due to removal of vegetation and compaction of soils by

construction equipment. Therefore, short- term, negligible adverse effects on soils would occur during project implementation if access by heavy machinery or other equipment is necessary for removal of the buildings. These effects would be mitigated by protocols established by the Park, such as only permitting the use of low ground pressure equipment, except for hauling on existing roadways, and removal of buildings by hand in sensitive areas. In addition, all areas where there has been ground disturbance would be seeded or planted with native species following project completion. Therefore, although the adverse effects on soils would be widespread across the District, they would be temporary.

As described in the No Action Alternative, approximately 2.41 acres of impervious surfaces would be eliminated when the buildings are removed, resulting in benefits to soils. Reducing the area of impervious surfaces should allow for increased infiltration and decreased rates of runoff and soil erosion, providing major, long- term beneficial effects to soils and abutting waterways. Once vegetation is reestablished in areas formerly occupied by buildings, plants would provide additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems. The beneficial effects provided by the vegetation would increase as the density of the plants increases.

4.3.2.2 Biotic Communities

4.3.2.2.1 Terrestrial Plant Communities

As in the No Action Alternative, direct, adverse effects to biotic communities would result during construction as a result of disturbance of vegetation communities by construction equipment and foot traffic. These effects would be short- term and negligible. Indirectly, Alternative A would provide major, long-term benefits to biotic communities consisting primarily of increasing and improving the quality of wildlife habitat; reducing impervious surfaces and associated runoff; reestablishing native plant communities to provide botanical diversity and additional habitat; and reducing potential threats to water quality in the Little River.

In addition to the beneficial effects to biotic communities as described in the No Action Alternative, this alternative includes active restoration of the entire District, including restoration of sites formerly occupied by buildings. As described in the No Action Alternative, removal of the buildings would allow a variety of plant community types to increase in area. These communities include Appalachian montane oak- hickory forest and eastern white pine successional forest dominated by eastern hemlock in the Wonderland Club. In Millionaire's Row, the Little River floodplain contains Appalachian montane oak- hickory forest, early successional Appalachian hardwood dominated by tulip poplar, and southern Appalachian cove forest areas could potentially expand. The occurrence of large sycamore trees in portions of the Little River and tributary floodplains indicates that these floodplain areas contain the heavily impacted montane alluvial forest, a community that is globally imperiled. Tributaries upslope of the Little River floodplain may have many of the same overstory species and may be classified as the same community type, but they typically lack the biological and structural diversity of the floodplain forest located within the

floodplain of larger rivers and streams. Removal of buildings throughout floodplain areas and cessation of chronic disturbance would allow for gradual succession back to this forest type.

In Society Hill and Daisy Town, forested areas experienced considerable disturbance due to past human activity. Plant communities present include early successional Appalachian hardwood forest dominated by tulip tree and red maple, with smaller areas of Appalachian montane oak- hickory, southern Appalachian cove, and Virginia pine successional forest communities.

In addition, removal of buildings throughout the District would eliminate the need to perform hazard tree removal beyond that which is done adjacent to trails and within the Elkmont Campground. As discussed in the No Action Alternative, implementation of Alternative A would eventually allow old growth canopy and understory vegetation to become reestablished. Within the study area, the globally imperiled montane alluvial forest would have an opportunity to expand up to 22 acres (9 hectares) throughout floodplain and wetland areas (see Table 4-3) once the buildings are removed.. Because no work is proposed in floodplains or wetlands under Alternative A, the potential for reestablishment of the montane alluvial forest is the same as that which would occur under the No Action Alternative.

Some areas of the District have been planted or infiltrated with invasive, non-native vegetation that reduces native species diversity and degrades the quality of wildlife habitat. Long- term management to control these plant species would provide additional benefits over and above those described in the No Action Alternative. The District has been surveyed by the NPS for invasive, non- native plant species and some treatment for control of those species has occurred. Alternative A proposes to dedicate funding to support management planning and staff to develop a comprehensive invasive, non- native species eradication plan throughout the District that would be implemented annually. This plan could be revised periodically as conditions change to continue to meet the objective of invasive, non- native species eradication. Over time, this management would benefit native plant populations by reducing competition, protecting hemlock communities from woolly adelgid infestation and increasing suitable habitat for wildlife species known to exist within the District. Alternative A would also provide long- term, major, indirect benefits to biotic communities by eliminating a potential source of invasive, non- native species that could spread to other areas of the District.

4.3.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative A. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these

measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and beneficial, resulting from an increase in the vegetation in abutting plant communities due to increased infiltration and associated decreases in runoff and soil erosion. Once vegetation is restored in areas formerly occupied by buildings, the plants would provide protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems.

4.3.2.3 Threatened, Endangered, Rare and Sensitive Species

Like the No Action Alternative, Alternative A would not directly affect federal- listed endangered or threatened species since none are known to occur within or adjacent to the project implementation area. However, removal of the buildings and restoration of disturbed areas would indirectly provide long- term, minor benefits by eventually expanding and improving wildlife habitat. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*) occur within the District. Implementation of Alternative A would create the potential for existing populations of these species to expand into revegetated areas. Similar benefits would also be provided to state- listed species for which the District contains potential habitat. Those species include running bittercress, rough hawkweed, Fraser's yellow loosestrife, broadleaf bunchflower, yellow nodding lady's tresses, peregrine falcon, common raven, North American river otter, longhead darter, and northern pine snake. Site- specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the Park would consult with the U.S. Fish and Wildlife Service and the state of Tennessee to determine measures to avoid, minimize, or mitigate adverse effects on the species. In addition, active management of invasive, non- native species would provide further long- term, minor benefits by improving species diversity.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*), is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall located within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be negligible. Following project implementation, expansion of the available area for infiltration and active restoration of plant communities should benefit water quality, indirectly providing minor benefits to aquatic species downstream such as the hellbender.

Although it is not federally or state- listed, the synchronous firefly species that has been observed in the District would likely benefit from expanded habitat as well. Alternative A, like the No Action Alternative, proposes removal of buildings over approximately 2.4 acres. Since most of the buildings are located near streams or rivers, their removal could increase moist grassy areas where synchronous fireflies are often found. The firefly has also been observed in cleared areas and grassy areas along roadways in the District. Elimination of the open, herbaceous habitat may affect the synchrony of the fireflies;

however, at this time, the role of synchrony in the ecology of this species is poorly understood, so it is difficult to quantify potential impacts.

4.3.2.4 Wetlands

Short- term, direct, minor adverse effects to wetlands would occur during project implementation as a result of disturbance created by heavy equipment in wetlands within Millionaire's Row. Although protocols have been established to avoid the potential for impacts to sensitive areas, the environment of the wetlands along Bearwallow Branch is not suitable for machine traffic or even heavy pedestrian traffic due to saturated soil conditions. Although these wetlands would be disturbed during project implementation, this disturbance would be temporary and further minimized through seeding of native species over disturbed soils. However, over the long term, wetlands would be indirectly benefited by removal of adjacent buildings and invasive, non- native species control. These effects would be major, primarily created by removal of chronic disturbance of wetland and abutting upland plant communities. The environment surrounding residential buildings has been subject to runoff from impervious surfaces, soil compaction, deposition of petrochemicals from automobiles and other household uses, planting of invasive, non- native species by prior residents, and vegetation management practices not conducive to the establishment of native plant communities. These types of disturbances result in loss of native plant diversity and subsequent degradation of wildlife habitat. Therefore, wetlands that abut residential properties would benefit from elimination of these chronic disturbances.

Indirectly, Alternative A would also create long- term, moderate beneficial effects by increasing several wetland functions and values, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, fish/shellfish habitat and recreation. Improving the wildlife habitat in areas adjacent to wetlands would enhance the wildlife habitat function by providing additional upland habitat and by increasing botanical diversity. Wildlife species that migrate into areas formerly occupied by buildings would utilize wetland habitat nearby as well. The aesthetic/visual quality value of the wetland would be improved by planting former building sites with native plant species. Removal of impervious surfaces would allow greater infiltration adjacent to the wetlands. The water quality and subsequently, the fish and shellfish habitat functions would improve due to the increased area available for infiltration, reduced area of pervious surfaces and lower potential for erosion and sedimentation of wetlands. In addition, repair of culverts to correct erosion problems would provide indirect benefits by ensuring that additional erosion and sediment- laden water does not make its way into abutting wetlands or floodplains. The recreational value of the wetlands potentially would increase because removal of the buildings would provide more opportunity for recreation such as wildlife watching, wildflower identification, fishing, hiking, and a variety of activities focused on observation and appreciation of biotic communities.

4.3.2.5 Water Quality

Like the No Action Alternative, Alternative A proposes removal of all historic buildings across all areas of the District and effects to water quality are similar to those described in the No Action Alternative. During construction, the possibility for short- term, minor adverse effects to water quality exists due to increased potential for erosion and sedimentation of surface waters. Due to restoration of native vegetation, following

construction the potential exists for minor, long- term, benefits due to increased soil stabilization, reduction of impervious surfaces (2.4 acres) and reduced runoff.

4.3.2.6 Floodplains

As described in the No Action Alternative, there would be no direct effects to the 100-year floodplain of the Little River or its tributaries as a result of implementing Alternative A. Long- term, indirect, moderate beneficial effects to these floodplains would be experienced through removal of buildings currently in and adjacent to the 100- year floodplain of Bearwallow Branch and the Little River. An increase in the area (3,520 sf) available for infiltration and flood storage would be a direct benefit due to removal of three buildings in the floodplain, (Miller (#46), Faust (#47), and Faust garage (#47A)), and their associated impervious surfaces. Another long- term, major, indirect benefit would be an increase in the area of associated plant communities, such as the Appalachian Montane Oak- Hickory Forest. In addition, the Appalachian Montane Alluvial Forest could, over time, regenerate at former building sites and in the adjacent floodplain in the absence of disturbance from residential use of the area. Additional indirect, long- term, minor benefits would be provided because removal of buildings within and adjacent to floodplains would eliminate future ground disturbance and soil compaction associated with residential use.

4.3.2.7 Air Quality

As in the No Action Alternative, projected visitation is not expected to change following implementation of Alternative A. However, there would be a temporary increase in emissions due to the operation of heavy equipment during project implementation. These effects could be minimized by reducing equipment idling times, ensuring that all construction equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September). Therefore, direct adverse effects to air quality would be short- term in duration and negligible, occurring only during construction.

There would be no direct or indirect effects to air quality following project implementation. Based on a busy Saturday in summer, the emissions of two key air pollutants resulting from the condition created by Alternative A in 2015 are projected to be 50.37 tons per year of NOx and 72.64 tons per year of VOCs (see Table 4- 8). These figures represent no change from the existing condition.

4.3.3 Impacts on Interpretation and Visitor Use

Implementation of Alternative A requires removal of all historic buildings in the District. Implementation of this alternative is not expected to change the number of visitors to the area and there would be no change in current interpretive programs conducted in the District. Interpretive programs include illustrated talks, as well as guided hikes, that cover a wide range of topics such as art, music, history, Native American culture and nature. However, this alternative requires revisions to the Elkmont Nature Trail brochure to include natural and cultural history information and installation of two wayside exhibits. These provisions would create direct, long- term minor beneficial effects on interpretation by providing visitors with additional educational material related specifically to the District.

4.3.3.1 Visitor Experience

Like the No Action Alternative, implementation of Alternative A would have direct effects on visitor experience that are both adverse and beneficial, depending on the visitor's perception. For those visitors who see the historic buildings in the District as detracting from the aesthetic beauty of the natural environment, Alternative A would provide direct, permanent, beneficial effects by removing the buildings from the landscape. Conversely, visitors who see the historic buildings as an important visual asset to the District, this alternative would result in direct, permanent, adverse effects on their experience.

Visitor experience would change considerably as a result of implementing Alternative A. Currently, the buildings and adjacent grounds are closed to the public. However, the District allows for multiple opportunities to view the extant cultural landscapes, including the buildings and smaller- scale features from existing roadways. Thus, the focus on the portion of the District that contains buildings is on cultural resources within their setting. If Alternative A was implemented, visitor experience would change to one focused primarily on natural resource restoration with interpretive opportunities related to the cultural and natural history of the District limited to publications, brochures, nature trail guides, Ranger programs and two wayside exhibits.

4.3.3.2 Visitor Facilities

As described in the No Action Alternative, Alternative A would create short- term, negligible, adverse effects to visitor facilities during project implementation. These effects would be caused by temporary access restrictions to prevent visitors from entering construction areas. No additional facilities would be provided as part of Alternative A.

4.3.4 Impacts on Socioeconomic Environment

Alternative A would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.3.4.1 Population and Environment

Alternative A would have no direct, indirect or cumulative effects on local or regional populations.

4.3.4.2 Land Use

As in the No Action Alternative, implementation of Alternative A would indirectly result in long- term, minor beneficial effects to land use. These effects would be achieved through opening the grounds to the public following removal of buildings and structures.

The eventual use of the District would remain consistent with the land use zone designations in the 1982 General Management Plan. Implementation of Alternative A would continue to allow for use of public roadway corridors, picnicking and camping at the Elkmont Campground, historical and natural resource interpretation through NPS programs and printed material, and accommodations at the existing quarters for Park staff.

4.3.4.3 Access and Circulation

During implementation, Alternative A would have negligible, short- term adverse effects on access and circulation. The buildings and grounds would remain closed during project implementation as a safety measure for visitors and alternate access to trailheads may need to be provided. To avoid impacting campground visitors, construction activities would take place when the campground is closed (December to February). These measures would greatly reduce the potential for adverse effects to access and circulation. During removal of the buildings, construction vehicles would add to visitor traffic to and from the District and could cause minor delays due to the reduced capacity for trucks carrying heavy loads to accelerate. However, in the long- term, because the level of service would remain the same with no change in average speed of travel, percentage of time spent following and headway between vehicles, there would be no effect on access and circulation following project implementation.

4.3.5 Impacts on Other Resources

4.3.5.1 Viewshed

Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the condition of the buildings.

The established baseline for this environmental analysis and the associated visual analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for the visual analysis. Permanent, direct, major, beneficial effects would be realized by removing 74 buildings from the landscape. All buildings and structures would be removed under this alternative thereby restoring the natural viewshed of the study area. Alternative A would improve upon the No Action Alternative by actively restoring the native plant communities within the study area In addition to removing the buildings and restoring natural conditions, Alternative A proposes to remove foundations, rock walls and other cultural landscape components. Removal of these features would indirectly augment the long- term, major, beneficial effect on visual quality because these components create minor obstructions of views of the District's natural resources. Direct, adverse impacts to the viewshed are expected to occur during implementation of Alternative A because of the presence of machinery and ground disturbance, but these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be permanent, major and beneficial under Alternative A due to removal of buildings, structures and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix D) would also be beneficially affected by building removal with regard to the area that is visible from the transportation corridors.

4.3.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during implementation of Alternative A due to construction activities. The high noise levels of internal combustion- powered equipment (usually diesel) are expected to be the primary contributor to sound levels during construction and can interfere with the ability of individuals near the work site to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The major sources of construction noise in this alternative may include removal of buildings, hauling, grading, and paving. Overall, construction noise would be relatively short in duration and restricted to daytime hours at the time of year in which visitation is expected to be the lowest. Following implementation of Alternative A, noise levels would likely remain in the range of 50 to 60 dBA, with the exception of those areas that would be restored to natural conditions. Natural conditions away from the influence of rivers or creeks and with little wind would likely result in sound levels in the 35 dBA range (see Table 4- 9). As in the No Action Alternative, once construction activities are complete, anticipated noise levels would not exceed the noise abatement criteria of 67 dBA, and Alternative A would have no long- term effect on noise in the District.

4.3.6 Impacts on NPS Operations

There would be no direct effects on NPS operations following implementation of Alternative A. As under the No Action Alternative, there would be no changes to existing access or circulation within the District. However, there would be indirect major beneficial effects due to removal of the Elkmont buildings. The current condition of the buildings, and the fact that visitors continue to enter them (even though they are closed), necessitates that NPS make repairs. In addition, the buildings have the potential to contain hazards such as the hanta virus, a disease spread by rodents, and histoplasmosis, which is spread by bats. Both of these contagions can be fatal to humans who come into contact with them. Some of the buildings contain a variety of debris, ranging from broken glass and fallen plasterboard to lead- based paint. Removal of hazards that pose a danger to the visiting public would lower the potential for harm, reduce the need for NPS law enforcement in the District, and ultimately provide permanent, major benefits to NPS operations.

As with the No Action Alternative, general maintenance and some law enforcement would still be required to monitor visitor use and safety, but the need for any funds or staff to protect the buildings from vandalism or to continue to maintain the buildings to prevent further deterioration would be eliminated. The NPS routinely performs vegetation management in the District to remove hazard and fallen trees adjacent to roads and paths. Some of the expenditures required for vegetation management adjacent to the buildings would be eliminated as buildings are removed, indirectly creating a permanent, major benefit for NPS operations through a reduction in costs associated with staff time and equipment needs. Removal of buildings would not completely eliminate the need for vegetation management, but would reduce NPS expenditures currently used to repair the buildings. In moist cove forest communities, such as those found in the District, research has shown that between one and one and one- half percent of canopy trees fail on an annual basis (Runkle 1982). Therefore, as described in the No Action Alternative, removal of hazard trees would continue to be performed at its current level.

Once the project related work is completed, no additional operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing, with the exception of that required to create and implement a more comprehensive, long- range invasive, non- native species management plan.

4.3.7 Cumulative Effects

The cumulative effects of implementing Alternative A would consist of long- term major beneficial effects to natural resources and permanent, major, adverse effects to cultural resources.

Similar to the effects described for the No Action Alternative, Alternative A would result in long- term, major, beneficial cumulative effects to biotic communities, habitat for threatened, endangered, rare and sensitive species, wetlands, water quality, and floodplains. These effects would result from removal of buildings throughout the District. Reestablishment of native plant communities at the former building sites would provide multiple benefits to aquatic, wetland and terrestrial environments through soil stabilization and reduction in erosion and sedimentation of surface waters. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from pavement runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Reduction of runoff and elimination of erosion help to lower the potential for contaminants to enter the river. At the same time, restoration of native plant communities not only increases total vegetation cover, but also increases the area of available habitat for a variety of fauna. Invasive, non- native plant species thrive in disturbance areas and permanent restoration with native species would create a long- term beneficial cumulative effect by reducing the area available for invasive, non- native species to become established, thereby decreasing the potential for these species to infiltrate into surrounding areas of the Park.

Effects on cultural resources are also similar to those described in the No Action Alternative. The direct, permanent, major, adverse effect on cultural resources in Alternative A is significant in a cumulative sense as well. While the Park contains a variety of historic buildings and cultural landscape components, the District buildings represent the only remaining collection of early 20th century resort cabins retaining integrity in the Appalachian Mountains of Tennessee (Thomason et al. 1993). Other resort properties representing this time period, such as hotels and lodges inside the Park, and hotel and cabin communities outside the Park, have either been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would contribute to the cumulative loss of buildings from this time period in southern Appalachian history.

There are no cumulative effects to other resources resulting from activities proposed in Alternative A when combined with effects resulting from project activities and foreseeable effects caused by other related undertakings.

4.3.8 Conclusion

Like the No Action Alternative, implementation of Alternative A would result in maintenance and / or enhancement of the long- term productivity of many of the natural

resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, and water quality. In general, the overall long- term productivity of all biotic resources would benefit from the increase in land available for restoration of native plant communities and implementation of a comprehensive invasive, non- native species management plan. Removal of buildings and structures throughout the District would increase the area available for reestablishment of the globally imperiled montane alluvial forest. In addition, restored vegetation within and adjacent to floodplains, wetlands and tributaries would further protect would further protect water quality of the Little River, an Outstanding National Resource Water. Visual quality, aesthetics and NPS operations would also benefit from Alternative A due to the removal of buildings that currently degrade visual quality and require NPS staff and funding to maintain and stabilize. Minor benefits to land use would also be provided when the District grounds are opened following removal of the buildings and structures.

However, irretrievable commitments of resources would result if Alternative A was implemented. These commitments would be created primarily by removal of the historic buildings within the District. This loss of cultural resources would be permanent, major and adverse. There is also potential for irreversible impacts to archeological resources as a result of implementation of this alternative, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures.

Unavoidable adverse impacts associated with implementing Alternative A are primarily direct, short- term, and negligible and would affect soils, biotic communities, noise, air quality, visitor experience, visitor use, access and circulation, and aesthetics and viewsheds. These effects would result from the disturbance created by construction operations and would be restricted to the project implementation period.

4.4 Impacts of Alternative B

Alternative B proposes retention of 12 cabins and the Appalachian Clubhouse in Daisy Town, and removal of all other historic buildings in the District, either by mechanical means or by hand. Visitation as a result of implementing Alternative B is not expected to change considerably; however, traffic within the District is expected to increase slightly (Table 4- 6). Existing recreational use would continue to occur. New exhibits are proposed under this alternative and the Elkmont Nature Trail brochure would be updated to include natural and cultural information on Elkmont. The Park would continue to implement its existing natural resource management activities.

Some changes to parking and circulation within the District would be required. Once this work was completed, a minor increase in operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing.

4.4.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

Implementation of Alternative B would constitute an adverse effect on the Elkmont Historic District, entered in the National Register of Historic Places (NRHP) on March 22, 1994. Alternative B would remove 37 buildings listed as contributing in the NRHP nomination, including the remains of the Wonderland Hotel, the Wonderland Hotel Annex, 32 cabins and 3 garages. The alternative would retain 12 contributing buildings, including the Appalachian Clubhouse and 11 contributing cabins. Also as part of Alternative B, one additional non- contributing cabin would be retained, resulting in a total of 13 buildings retained under Alternative B. The majority of Elkmont's cultural landscape elements and features also would be retained under this alternative. Implementation of this alternative would compromise the overall layout and spatial patterns among the component resources of the historic district, and its integrity would be lost.

While the overall effect on the District would be adverse, because Alternative B incorporates the continued use of 13 historic buildings within the Appalachian Club into ongoing Park operations, the long- term preservation of these resources would be guaranteed and would be considered a beneficial effect. This particular area evokes the strongest sense of community within Elkmont and offers the greatest opportunity for visitors to understand the former vacation community and the broad cultural pattern of second- home vacation cabins from the early 20th century. Daisy Town also offers the best cross section of Elkmont's various construction techniques and building materials, as well as preserving the only "set- off" cabins in the Park. The Appalachian Clubhouse would be rehabilitated as a day- use rental for the public.

The cultural landscape characteristics and features of Elkmont, such as the historic swimming hole at Little River, stone walls and a footbridge over Bearwallow Branch, would be retained under this alternative as would other eligible cultural landscape features. The preservation of the retained cabins and rehabilitation of the clubhouse would be conducted in accordance with *The Secretary of the Interior's Treatment Standards*.

Where adequate documentation is available, all modern, exterior changes made to cabins that post- date 1940, will be restored to a point within the listed period of significance. This includes, but is not limited to, elements such as porch decking, porch posts and rails, modern additions and modern substitutions of original materials.

The Swan cabin (#4), considered non- contributing because it has lost its integrity, will be restored to a point within the period of significance. Conspicuous modern additions, such as the deck, side and rear rooms, will be removed from this building. Based on available documentation, building features that have been altered, such as the porch, posts, railings and foundation piers, will be restored or recreated to a point within the period of significance. This building will be restored to maintain the spatial relationship of the established streetscape in Daisy Town.

This alternative would introduce new visual elements into the District, including the orientation kiosk, eight wayside exhibits, four parking areas, and paths leading from the parking areas to exhibits. Indirect adverse effects on cultural resources would be minor, but long- term. These indirect effects would be caused by a modest increase in the number of internal trips to the restored buildings, along with wear and tear from pedestrian traffic to the Appalachian Clubhouse and, potentially, on the porches of the retained Daisy Town cabins. Overall visitation and use specified for most buildings and features is primarily interpretive under Alternative B.

The interpretive exhibits, parking areas, new paths and roads, and stream bank stabilization at eroded culverts would create minor adverse effect on District cultural resources. The proposed new elements would constitute a minimal visual change. In addition, the proposed parking areas, paths, and roads would be located in areas already visually impacted by existing roads, parking areas and modern buildings slated for removal. The proposed utility lines would be buried in the ground, thereby removing visually intrusive power poles that postdate the period of significance.

Archeological Resources

As with all alternatives, the potential for Alternative B to impact archeological resources depends on the level, extent and location of ground- disturbing activities. The Park will implement strategies to avoid or minimize any impacts on archeological resources. Alternative B proposes removal of fewer buildings than the No Action Alternative. The use of heavy equipment and transport of materials for structural rehabilitation, restoration and preservation could result in ground disturbance in Daisy Town as well. Installation of new water, sewer and electrical lines, and paving existing or creating new parking areas would result in additional disturbance that could also affect archeological resources. All of these adverse effects would be direct, permanent, and could be major.

The areas where archeological resources could potentially be adversely affected include one locus where a significant resource has been documented, six loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at ten loci. Compared to the No Action Alternative, this alternative includes two additional loci where potentially significant resources have been identified. Those resources could be adversely affected by installation of a water line and the Little River Trail parking area. The ultimate impacts to archeological resources due to project implementation would depend on the

outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, removal of 37 contributing buildings within the NRHP listed Elkmont Historic District would constitute an adverse effect. Implementation of this alternative would compromise the overall layout and spatial patterns among the component resources of the historic district, and its integrity would be lost.

As discussed under the previous archeology discussion, the potential effects to archeological resources under Alternative B could also result in a determination of adverse effect if the proper avoidance or protective strategies for archeological resources are not implemented.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type (s) and cost of the mitigation cannot be calculated at this time.

4.4.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative B would result primarily from ground- disturbing activities and road and parking lot construction. These effects are discussed below for each natural resource.

4.4.2.1 Soils

Whenever ground- disturbing activities take place there is potential for increased rates of erosion due to soil compaction and removal of vegetation. This alternative proposes removal of 61 buildings in Elkmont Historic District. Therefore, there would be short-term, moderate, adverse effects on soils during project implementation if access by heavy machinery or other demolition equipment is necessary for removal of the buildings. These effects would be mitigated by protocols established by the Park, such as only permitting the use of low ground pressure equipment, except for hauling on existing roadways, and removal of buildings by hand in sensitive areas. In addition, all areas where there has been ground disturbance would be seeded and planted with native species following project completion. Therefore, the adverse effects on soils due to construction activities would be temporary, but the long- term result of restoring native vegetation would provide moderate benefits to soils.

Although impervious surfaces would be removed in some areas under this alternative, in other areas, impervious surfaces would be added by the construction of roads and paths. A large area of impervious surfaces (2.04 acres; see Table 4- 3) would be eliminated when 61 buildings are removed. Subsequently, rates of runoff and soil erosion would decrease in those areas, providing indirect, long- term, moderate benefits to soils and adjacent waterways. Once vegetation is reestablished in areas formerly occupied by buildings, the plants would supply additional protection from erosion by absorbing rainfall impact on bare soils and by stabilizing soils with their root systems. The beneficial effects provided

by the plants would increase as the vegetation becomes more established and expands in area.

Additional activities required under Alternative B include paving of four parking areas with pervious pavement, installation of new water and sewer lines, underground utility lines, road repairs, and road and path construction. All of these activities would cause additional ground disturbance and result in short- term, minor, adverse effects to soils over a wider area in the District than in the No Action Alternative. In the long term, since the number of visitors is not expected to change and the estimated increase in internal pedestrian trips is minimal (see Table 4- 7), the soil compaction and related adverse impacts to plants from trampling would likely be negligible.

Although some infiltration is possible where pervious concrete is used (as proposed for parking lots), the surface is only able to absorb the first one inch of precipitation and would produce higher rates of runoff than undisturbed, vegetated surfaces. However, runoff is only expected to increase over the No Action Alternative by approximately 0.8 percent and the use of pervious pavement would provide indirect, long- term moderate benefits to a variety of resources by eliminating chronic erosion originating from unpaved areas currently utilized for parking.

In Society Hill, Alternative B restricts vehicular access along Jakes Creek Road south of Daisy Town by relocating a gate. This provision would provide long- term, minor benefits to Society Hill by eliminating the source of chronic soil disturbance, soil compaction and release of contaminants from automobiles.

4.4.2.2 Biotic Communities

4.4.2.2.1 Terrestrial Plant Communities

Direct, adverse effects to biotic communities would result during construction as a result of disturbance of vegetation communities by construction equipment. These effects would be negligible and short- term. However, wildlife in the District may indirectly experience long- term, major benefits resulting from an increased area and improved quality of habitat for both wildlife and the globally imperiled montane alluvial forest.

As described in the No Action Alternative, removal of the historic buildings would allow a variety of plant community types to increase. In the Wonderland Club, these communities include Appalachian montane oak- hickory forest and eastern white pine successional forest dominated by eastern hemlock. In Millionaire's Row, the floodplain of Bearwallow Creek contains early successional Appalachian hardwood forest dominated by tulip poplar, Appalachian montane oak- hickory forest and southern Appalachian cove forest. The occurrence of large sycamore trees in portions of the Little River and tributary floodplains indicates that these floodplain areas contain the heavily impacted montane alluvial forest, a community that is globally imperiled. Tributaries upslope of the Little River floodplain may contain many of the same overstory species and may be classified as the same community type, but they typically lack the biological and structural diversity of the floodplain forest located within the floodplain of larger rivers and streams. Removal of buildings

throughout floodplain areas and cessation of chronic disturbance would allow for gradual succession back to this forest type.

In Society Hill, forested areas have been considerably disturbed by past human activity. Plant communities present include early successional Appalachian hardwood forest, dominated by tulip tree and red maple, with smaller areas of Appalachian montane oak- hickory, southern Appalachian cove, and Virginia pine successional forest communities. The majority of the Daisy Town buildings are proposed to be retained under Alternative B, which eliminates the potential for expansion of plant communities on those sites. Chronic disturbance would continue in this area of the District, resulting from pedestrian traffic and vegetation management.

Retention of buildings in Daisy Town would require hazard tree removal beyond that which is performed adjacent to trails and within the Elkmont Campground. For historic buildings and grounds which have public access, the Park typically intensely manages the surrounding landscape and, although efforts would be made to retain as much of the forest communities as possible at Elkmont, the initial effort to remove hazard trees around retained structures would be aggressive. Annual maintenance of the perimeter around historic structures would continue to be intensive, thus truncating the age/size distribution by removing hazard trees that are often old or large and subsequently, adversely affecting the old growth stage of development. Implementation of Alternative B would increase the need for hazard tree management above that which is currently performed throughout the District and would adversely affect plant communities primarily throughout Daisy Town. These indirect effects are expected to be minor, but increase incrementally as more buildings are retained because additional hazard tree management would be required. In the remainder of the District, removal of the buildings would eventually allow forests to reach the old growth stage of development.

Within the study area, the globally imperiled montane alluvial forest would have an opportunity to expand up to 22 acres (9 hectares) throughout floodplain and wetland areas (see Table 4- 3) once the buildings are removed and hazard tree management is no longer necessary in these areas. Because no work is proposed in floodplains or wetlands under Alternative B, the potential for reestablishment of the montane alluvial forest is the same as that which would occur under the No Action Alternative.

4.4.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative B. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, due to the nature of the work, unavoidable, yet negligible discharges of sediment into aquatic environments could occur.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and beneficial, resulting from an increase in the vegetation in abutting plant communities due to increased infiltration and associated decreases in runoff and soil erosion. Once vegetation is restored in areas formerly occupied by buildings, the plants would provide protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems.

4.4.2.3 Threatened, Endangered, Rare and Sensitive Species

Like the No Action Alternative, Alternative B would not directly affect federal- listed endangered or threatened species since none are known to occur within or adjacent to the project implementation area. However, removal of the buildings and restoration of disturbed areas would indirectly provide long- term, minor benefits by eventually expanding and improving wildlife habitat. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*) occur within the District. Implementation of Alternative B would create the potential for existing populations of these species to expand into revegetated areas, with the exception of the Daisy Town area in which buildings are proposed to be retained. Similar benefits would also be provided to state-listed species for which the District contains potential habitat. Those species include running bittercress, rough hawkweed, Fraser's yellow loosestrife, broadleaf bunchflower, yellow nodding lady's tresses, peregrine falcon, common raven, North American river otter, longhead darter, and northern pine snake. Site- specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the Park would consult with the U.S. Fish and Wildlife Service and the state of Tennessee to determine measures to avoid, minimize, or mitigate adverse effects on the species.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*), is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall located within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be negligible. Following project implementation, expansion of the available area for infiltration should provide minor benefits to water quality, indirectly benefiting aquatic species downstream such as the hellbender.

Although it is not a federally or state- listed species, the synchronous firefly that has been observed in the District would likely benefit in the short- term from expanded habitat as well. Alternative B proposes removal of buildings that could increase moist, grassy areas where synchronous fireflies are often found. However, over the long term, without management to sustain those herbaceous habitats, woody vegetation would eventually encroach upon the area, possibly affecting the synchronism of this species. At this time, the role of synchrony in the ecology of this species is poorly understood, so this impact is difficult to quantify.

4.4.2.4 Wetlands

Short- term, direct, minor adverse effects to wetlands would occur during project implementation as a result of disturbance created by heavy equipment in wetlands within Millionaire's Row. Although protocols have been established to avoid the potential for impacts to sensitive areas, the environment of the wetlands along Bearwallow Branch is not suitable for machine traffic or even heavy pedestrian traffic due to saturated soil conditions. Although these wetlands would be disturbed during project implementation, this disturbance would be temporary and further minimized through seeding of native species over disturbed soils. However, wetlands may be indirectly benefited by the removal of adjacent buildings, such as those found in Millionaire's Row.

The environment surrounding residential buildings is subject to runoff from impervious surfaces, soil compaction, deposition of petrochemicals, effects of planting of non-native species (by prior residents of the District), and vegetation management. These types of chronic disturbances tend to result in loss of native plant diversity and subsequent degradation of wildlife habitat. Wetlands that abut residential properties would benefit from elimination of these chronic disturbances. These effects would be long- term, but minor.

Implementing Alternative B would benefit wetlands by increasing several wetland functions and values, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, fish/shellfish habitat and recreation. Improving wildlife habitat in areas adjacent to wetlands would enhance the wildlife habitat function by providing additional upland habitat and by increasing botanical diversity. Wildlife species that migrate into areas formerly occupied by buildings would utilize wetland habitat nearby as well. The aesthetic/visual quality value of the wetland would be improved by planting those sites with native plant species. Removal of impervious surfaces would allow greater infiltration adjacent to the wetlands. Both the water quality and subsequently, the fish and shellfish habitat functions would improve due to the increased area available for infiltration and reduction in the area of impervious surfaces. In addition, repair of culverts to correct erosion problems would provide indirect benefits by ensuring that additional erosion and sediment- laden water does not make its way into abutting wetlands or floodplains. As described in the No Action Alternative, the recreational value of the wetlands potentially would also increase because removal of the buildings would provide more opportunities for recreation, such as wildlife watching, wildflower identification, fishing, hiking, and a variety of activities focused on observation and appreciation of biotic communities.

4.4.2.5 Water Quality

Water quality can be affected by a variety of activities resulting in discharge to surface waters both during and following project implementation. Alternative B would result in changes to surface water runoff rates and volumes, and would require additional discharge of treated effluent into the Little River. Both of these activities would have negligible effects on water quality. Potential impacts to water quality resulting from implementation of Alternative B are described below.

The adverse effects on water quality resulting during project implementation are expected to be short- term and negligible, primarily caused by disturbance created by heavy equipment used to remove buildings and to transport materials into areas in which

restoration, rehabilitation and preservation are proposed. Although Best Management Practices would be followed, there would still be potential for erosion in disturbance areas and sedimentation into water bodies to occur during project implementation. However, once the areas are planted and vegetation becomes established, a large area (2.04 acres) of impervious surfaces would be eliminated, reducing runoff that could contaminate District waterways and providing long- term, minor benefits to water quality.

All of the proposed infrastructure components (water lines, sewer lines, electrical service, parking areas) associated with this and other alternatives would be placed to minimize the potential for soil erosion and sediment transport to surface waters within the District. Where possible, to minimize potential impacts, pipelines have been planned to be suspended under bridges to cross streams, rather than be placed under the streambed. Where lines cannot be hung from bridges, they would be bored under the streambed, avoiding the potential for disturbance to the stream substrate and potential impacts to water quality.

The need for additional parking areas varies in each alternative with the initial consideration being the expansion, reconfiguration and resurfacing of existing parking areas, where possible, and then constructing new parking areas where beneficial and/or necessary. Areas currently used for parking are not paved and vehicular traffic has resulted in loss of vegetation, soil compaction and erosion. Projected annual rainfall runoff from pavement is shown in Table 4- 5. A very small (0.8 percent) increase in runoff over the existing condition is expected to occur as a result of implementing Alternative B. This small quantity would have no effect on water quality.

Sewage Treatment and Pollutant Discharge

No change in water quality would result from sewage treatment and pollutant discharge following implementation of Alternative B. As shown in Tables 4- 10 and 4- 11, the total amount of discharge pollutants remain at baseline levels under Alternative B. There are not any baseline conditions established for thermal loading, other than typical wastewater temperatures of 60° Fahrenheit (see Section 2.2.1). However, the incremental increase in effluent discharge in this alternative would be such that temperature effects are negligible (McGill Associates 2004). The effluent discharge rate would remain the same as the existing condition under all alternatives. At the current rate of discharge, thermal impacts are dissipated entirely within three feet of the discharge pipe due to effluent mixing with cooler water in the pipe from the plant to the discharge point. Because the cooling would continue and the rate of discharge would remain the same under all alternatives, there would be no thermal impacts to the Little River as a result of implementing this alternative (McGill Associates 2004).

In addition, the sewer line under Jakes Creek to serve the Appalachian Clubhouse would be located above the Little River's confluence with Jakes Creek. The line would be placed in this location to minimize any in- stream impacts to both Jakes Creek and the Little River. Since the Appalachian Club interior would be rehabilitated for day use, public restroom facilities would be required. The additional wastewater associated with this action that would require treatment is estimated at 1,300 gallons per day. This additional wastewater discharge is minor and can be adequately treated within permitted limits and without any improvements to the existing treatment plant. Water quality

standards for Outstanding National Resource Waters would continue to be met because concentrations of contaminants would remain below the water supply maximum contaminant level (See Table 4- 12). Therefore, rehabilitation and reuse of the Appalachian Clubhouse would have no effect on water quality.

4.4.2.6 Floodplains

There would be no direct effects to the 100- year floodplain of the Little River or its tributaries as a result of implementing Alternative B. Long- term, indirect, moderate beneficial effects to these floodplains would be experienced through removal of buildings currently in and adjacent to the 100- year floodplain of Bearwallow Branch and the Little River. An increase in the area (3,520 sf) available for infiltration and flood storage would be a direct benefit due to removal of three buildings in the 100- year floodplain (Miller (#46), Faust (#47), and Faust garage (#47A)) and their associated impervious surfaces. Another direct benefit would be an increase in the area for establishment of associated plant communities, such as the montane alluvial forest, that could regenerate at former building sites. Restricting vehicular access and removing buildings in areas adjacent to floodplains would provide indirect benefits by increasing the area available for infiltration, thereby reducing the demand for flood storage within the floodplains. Additional permanent, moderate indirect benefits would be achieved because removal of buildings within and adjacent to floodplains would eliminate future ground disturbance and soil compaction associated with residential use.

4.4.2.7 Air Quality

Air quality can be affected by increases in vehicular traffic and by how this traffic moves throughout the District. Increased engine idling times will generally occur as traffic congestion causes increases in travel time along roadways, within parking areas, at gates, and at destination points that are visible from the roadway, such as at wayside exhibits. Longer idling times result in increased emissions.

As in the No Action Alternative, projected visitation to the District is not expected to change following implementation of Alternative B. However, there would be a temporary increase in emissions due to operation of equipment during project implementation. Therefore, direct adverse effects to air quality would be short- term in duration and negligible, occurring only during construction. These effects could be minimized by reducing equipment idling times, ensuring that all equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September).

Once construction is complete, internal trips within the District are expected to increase and the specifics of this alternative that could affect the quantity of emissions discharged into the District include construction of parking lots in the Appalachian and Wonderland Clubs. An analysis was performed by the Park to evaluate the potential nitrogen deposition and nitrogen dioxide (NO_2) impacts from the use of the proposed Appalachian Club and Wonderland Club parking lots. The EPA CALPUFF model was run in the screening mode for 5 years with National Weather Service data from Knoxville, Tennessee. As a worst case, screening analysis emissions from both parking lots were combined. A range of vehicle emissions from the parking lots reflecting both a high use and a moderate use scenario were modeled. The high use scenario assumes eight tons per year of nitrogen oxide (NO_x) vehicle emissions and the moderate use

scenario assumed 4 tons per year of NOx vehicle emissions. Two different season lengths were analyzed. One season length assumes year around use and the other season assumed nine months of use with the parking lots shut down during November, December and January. Emissions were pro- rated by hours of the day with no emissions assumed from midnight to 6:00 am. Nitrogen deposition was calculated for the distances of 9 mile and 11 miles to reflect the distances to Clingmans Dome and Noland Divide, respectively. The analyses show impacts very far below the nitrogen deposition threshold of 0.01 kilograms per hectare per year. The impacts were in the range of one- ten thousandth of the nitrogen deposition threshold. The visible haze analysis indicates no visible haze impacts. The maximum impact of nitrogen dioxide to the annual NO2 Class I Prevention of Significant Deterioration (PSD) increment was approximately 0.017 micrograms per cubic meter (ug/m^3), or one- sixth of the EPA Class I significance level (0.1 ug/m^3). A visible plume analysis using the EPA VISCREEN model in the Level 1 mode also indicated that there will not be a visible plume impact from the vehicle emissions.

In an independent air quality assessment performed by McGill Associates based on a busy Saturday in summer, the emissions of two key air pollutants resulting from the condition created by Alternative B in 2015 are projected to be 50.37 tons per year of NOx and 72.64 tons per year of VOCs (see Table 4- 8). These figures represent no change from the existing condition. As a result, no indirect effects to air quality are anticipated as a result of implementing Alternative B.

4.4.3 Impacts on Interpretation and Visitor Use

Implementation of Alternative B requires removal of most of the historic buildings in the District. Removal of the buildings is not expected to change the number of visitors to the area, although there would be a moderate increase in the number of visitor trips to interpretive exhibits. Interpretive programs include illustrated talks as well as guided hikes that cover a wide range of topics such as art, music, history, Native American culture and natural history. The Elkmont Nature Trail brochure would be revised to include historical information about Elkmont, the Appalachian Clubhouse would be restored for public day use rental, some of the cabins in Daisy Town would be restored on the exterior for use as interpretive exhibits and additional exhibits would be installed throughout the District.

4.4.3.1 Visitor Experience

Visitor experience is expected to change considerably as a result of implementing Alternative B. Although removal of most of the buildings and restoration and preservation of others is not expected to significantly change visitor use, there would be an increase in the level of interpretive efforts. Providing additional historical information in the Elkmont Nature Trail brochure, an orientation kiosk with exhibits, up to eight wayside exhibits throughout the District, and a set of interior exhibits at the Appalachian Clubhouse would indirectly have a long- term, moderate, beneficial effect on visitor experience in the District. The visiting public would have the opportunity to learn about the establishment and history of Elkmont, and the cultural and natural resources of the District.

Alternative B would provide indirect, major, permanent, effects to the visitor experience by removing some of the buildings from the landscape. These effects would be adverse

due to removal of buildings in the Wonderland Club, Millionaire's Row and most of Society Hill and beneficial due to the retention and restoration and preservation of cabins in Daisy Town. However, in contrast to the previous alternatives, wayside exhibits, interior exhibits, and updating of the trail brochure in Alternative B would provide visitors with an understanding of what they are viewing in the District and to have a sense of time and place associated with the buildings.

Currently, the buildings and adjacent grounds are closed to the public and the present condition of the District allows for multiple opportunities to view the intact cultural landscapes, including the buildings and smaller- scale features, from existing roadways. Thus, the focus on the portion of the District that contains buildings is on investigation and discovery of cultural resources within their setting. If Alternative B were implemented, visitor experience would change to one focused primarily on natural resources with cultural interpretation opportunities available at wayside exhibits, at cabins retained in Daisy Town, through use of the Appalachian Clubhouse, and through retention of cultural landscape elements. The remainder of the District would be restored to native plant communities.

4.4.3.2 Visitor Facilities

Visitor facilities would experience long- term, moderate, direct and indirect benefits as a result of implementing Alternative B. Although most of the historic buildings would be removed under this alternative, a variety of visitor facilities would be added. A total of eight wayside exhibits, an orientation kiosk with self- guiding tour booklet, and an update to the Elkmont Nature Trail brochure would be added under Alternative B. Additional exhibits installed inside the Appalachian Clubhouse would provide historical information and pictures. These exhibits would serve as a self- guiding museum and the Clubhouse would be available for public rental as a day use facility. The interpretive features would provide visitors with information on the natural and cultural resources. With the addition of the exhibits, visitors would gain the ability to understand the history behind establishment of the Town of Elkmont, the history of the Appalachian and Wonderland Clubs and train stations, and to learn about the establishment of Great Smoky Mountains National Park and the relationship of Elkmont to the Park. Exhibits describing the natural and cultural history of the area would be placed strategically to orient visitors as they enter the District and at most of the major sections of the District, including the campground.

Other long- term minor benefits to visitor facilities provided by Alternative B include construction or repaving of four parking areas in the District, repaving or widening several roads, construction of asphalt walking paths and restoration of the Appalachian Club, including restroom facilities, for day use. Some of the areas in which visitors currently park are not paved and are eroded, rutted and generally disturbed. Creation of pervious pavement lots would provide a stable surface for parking while preserving the aesthetic quality of the environment expected by the visiting public in a National Park. In addition, day use and restroom facilities would be provided at the Appalachian Clubhouse. These facilities would be accessible to the visiting public and would help to decrease the demand on campground facilities reducing the need for visitors to drive into the campground to access restrooms, eliminating some of the potential disturbance to campers.

4.4.4 Impacts on Socioeconomic Environment

Alternative B would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.4.4.1 Population and Environment

Alternative B would have no direct, indirect or cumulative effects on local or regional populations.

4.4.4.2 Land Use

Implementation of Alternative B would indirectly result in long- term, moderate beneficial effects to land use. These effects would be achieved through opening the grounds to the public following removal of some of the buildings and structures and by providing additional opportunities for those uses described in the land use zone designations in the 1982 General Management Plan. Implementation of Alternative B would continue to allow for use of public roadway corridors, accommodations at the existing quarters, and picnicking and camping at the Elkmont Campground. Historical and natural resource interpretation would be increased over that which is currently offered (through NPS programs and printed material) through installation of a variety of exhibits, retention of some buildings for interpretive uses, and the Appalachian Clubhouse as a public day use rental facility and self- guiding museum. These uses would be supported by alterations to existing infrastructure including new parking areas and restroom facilities. Internal trips within the District are expected to increase slightly as a result of implementing Alternative B (Table 4- 7); however, overall visitation to the District is not expected to increase relative to the No Action Alternative. Therefore, increased visitor opportunities within the District are not expected to result in land use conflicts (such as traffic congestion, crowding, etc.) if Alternative B is implemented.

4.4.4.3 Access and Circulation

During implementation, Alternative B would create negligible, short- term, adverse effects on access and circulation. Although the buildings and grounds would remain closed during construction to prevent safety hazards to visitors, alternate access to trails in the area may need to be provided. To avoid impacting campground visitors, construction activities would take place when the campground is closed (December to February). These measures would greatly reduce the potential for adverse effects to access and circulation. During removal of the buildings, construction vehicles would add to visitor traffic to and from the District and might cause minor delays due to the reduced capacity for trucks carrying heavy loads to accelerate.

Once implemented, Alternative B proposes a low intensity of reuse for the District including exterior restoration of cabins in one area for use as interpretive exhibits. Because the proposed redevelopment is minimal and visitation to the District is not expected to change, this alternative is not likely to affect access and circulation. However, an increase in total daily trips is expected to occur under this alternative, from 1,340 in the No Action Alternative to 2,030. Internal pedestrian trips would increase from 431 to 435. A complete comparison of estimated change in volume of trips between alternatives is provided in Tables 4- 6 and 4- 7 at the end of this chapter. A number of roadway modifications have been proposed to alleviate potential internal traffic conflicts as visitors travel between exhibits and other areas of the District. The potential for pedestrian and vehicle conflicts would be minimized through resurfacing of an

overgrown path in Daisy Town to separate visitors viewing the restored cabins from vehicular traffic on Daisy Town Loop Road. The existing gate on Jakes Creek Road would be relocated to just south of the road to Jakes Creek Cemetery to prevent vehicular traffic from traveling farther up Jakes Creek Road. Although the potential for vehicle and pedestrian conflicts would still exist, these proposed modifications would provide a long- term, moderate beneficial effect by providing additional safety measures for visitors. Following project implementation, the level of service is not expected to change along District roadways, resulting in no change in average travel speed, percentage of time spent following or headway between vehicles.

4.4.5 Impacts on Other Resources

4.4.5.1 Viewshed

Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the condition of the buildings.

The established baseline for this environmental analysis and the associated visual analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for the visual analysis. The buildings within the study area are considered obstructions to the natural viewshed that would be removed if the General Management Plan (the No Action Alternative) was implemented. In addition to retention of some buildings, Alternative B proposes to retain foundations, rock walls and other cultural landscape components. .As a result, long- term, indirect, minor, adverse effects would be created by retention of most of the Daisy Town buildings, the Appalachian Clubhouse, and some cultural landscape components. Although retention of these buildings and cultural landscape components would adversely affect visual quality by obstructing the natural viewshed, some long- term, minor benefits to visual quality and aesthetics would be realized through removal of the remainder of the buildings in the District and increasing the area available for restoration of native plant communities (photos 3 through 6A in Appendix D depict the existing views of a variety of historic buildings and simulations of the potential views following removal of these buildings). Direct, adverse impacts to the District viewshed are expected to occur during implementation of Alternative B because of the presence of machinery and ground disturbance but these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be long- term, minor, and adverse under Alternative B due to retention of some buildings, structures and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix D) would also be adversely impacted by building retention with regard to the area that is visible from the transportation corridors.

4.4.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during implementation of Alternative B due to construction activities. High noise levels of combustion- powered equipment, particularly due to earth moving equipment (usually diesel), are expected to be the primary contributor to the sound levels during construction and can interfere with the ability of individuals near the work site and passersby to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The major sources of construction noise in this alternative may include removal of buildings, hauling, grading, and paving. Overall, construction noise would be relatively short in duration and restricted to daytime hours at the time of year in which visitation is expected to be the lowest.

Following construction activities associated with project implementation, it is expected that future noise levels under Alternative B would likely be in the range of 50 to 60 dBA (see Table 4- 9). As in the No Action Alternative, since these noise levels do not exceed the noise abatement criteria 67 dBA, Alternative B would have no long- term effect on noise levels in the District.

4.4.6 Impacts on NPS Operations

In addition to removal of historic buildings, Alternative B includes modifications to existing infrastructure, increasing the number of parking lots and paving with pervious pavement, restoration of cabins for use as interpretive exhibits and restoration and rehabilitation of the Appalachian Club for day use. All of the new visitor facilities, exhibits and infrastructure would have to be maintained by NPS staff. However, the effect of implementing Alternative B on NPS operations would be permanent, moderate and beneficial, primarily because the need to stabilize, maintain and police buildings across the District would be largely eliminated, with the exception of the 12 cabins retained in Daisy Town and the Appalachian Clubhouse. Therefore, although there are costs associated with restoring and preserving the 13 buildings and for maintaining the upgraded infrastructure (i.e. cleaning pervious pavement, maintaining exhibits, etc.), this cost would be greatly reduced over the existing condition. The cost would also be offset by revenue generated from rental of the Appalachian Clubhouse as a day use facility.

Indirect beneficial effects on NPS operations would also result due to removal of the Elkmont buildings. The buildings have the potential to contain hanta virus, a disease spread by rodents, and histoplasmosis, which is spread by bats. Both of these contagions can be fatal to humans who come into contact with them. Some of the buildings contain a variety of debris, ranging from broken glass and fallen plasterboard to lead- based paint. Removal of hazards that pose a danger to the visiting public would remove the potential for harm, reduce the need for NPS law enforcement in the District, and ultimately provide permanent, moderate benefits to NPS operations.

In moist cove forest communities, such as those found in the District, research has shown that between one and one and one- half percent of canopy trees fail on an annual basis (Runkle 1982). Therefore, the NPS currently manages vegetation adjacent to the buildings and removes hazard trees where necessary. Some of these trees have fallen on buildings in the past, requiring removal of the downed tree and repair of damage to the building(s). Some of the expenditures required for vegetation management adjacent to the buildings would be eliminated as buildings are removed, indirectly benefiting NPS

operations through a reduction in costs associated with staff time and equipment needs. However, the overall indirect effect on NPS operations due to hazard tree and other vegetation management is expected to be minor, long- term and adverse because additional areas of the District and the grounds besides the area that is currently open to the public would be opened and would require aggressive vegetation management. Because the grounds would be opened to the public, even where buildings are removed the NPS must manage vegetation to provide for visitor safety. Hazard trees adjacent to exhibits, trails and roadways would continue to be removed as needed to reduce the possibility that visitors could be harmed by falling trees.

4.4.7 Cumulative Effects

Like the No Action Alternative, cumulative effects would include long- term, major benefits created by removal of buildings and subsequent revegetation throughout the District under Alternative B. Reestablishment of native plant communities provides multiple benefits to the aquatic and terrestrial environment through soil stabilization and reduction in erosion and sedimentation. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from parking area runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Reduction in runoff and elimination of erosion help to lower the potential for contaminants to enter the river. At the same time, restoration of native plant communities not only increases total vegetation cover, but also increases the area of available habitat for a variety of fauna and the potential for reestablishment of the globally imperiled montane alluvial forest.

Invasive, non- native plant species thrive in disturbance areas. The spread of these species could be further exacerbated by increased disturbance caused by pedestrian traffic into sensitive areas. Permanent revegetation with native species would create a beneficial cumulative effect by reducing the area available for invasive, non- native species to become established, thereby decreasing the potential for these species to infiltrate into surrounding areas of the Park. Failing to continue a comprehensive, invasive, non- native species management program at Elkmont Historic District could, over time, result in the spread of those species into other areas of the Park adding exponentially to the existing adverse effects that these invasive species have on the Park's botanical diversity.

The loss of aboveground cultural resources in Alternative B is significant and would result in a permanent, adverse, cumulative effect. While the Park contains a variety of historic buildings and cultural landscape components, the District represents the only remaining community of this type and time period in the Park. Other resort properties representing this time period, such as hotels and lodges inside the Park, and hotel and cabin communities outside the Park, have either been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would cumulatively result in loss of groupings of buildings representing this period in southern Appalachian history

4.4.8 Conclusion

Like the No Action Alternative, implementation of Alternative B would result in maintenance and / or enhancement of the long- term productivity of many of the natural

resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, and water quality. In general, the overall long- term productivity of all biotic resources would be benefited due to the increase in land available for restoration of native plant communities. Removal of buildings and structures throughout the District would increase the area available for reestablishment of the globally imperiled montane alluvial forest. In addition, restored vegetation within and adjacent to floodplains, wetlands and tributaries would further protect water quality of the Little River, an Outstanding National Resource Water. Removal of most of the buildings would benefit NPS operations by eliminating the need for resources to maintain and stabilize them. Long-term, minor adverse effects to NPS operations would be created due to the additional vegetation management required adjacent to the buildings retained. However, retention of some buildings and opening the District grounds following project implementation would indirectly provide long- term benefits to land use and interpretation, allowing for increased opportunities for visitors to view interpretive displays with information on the cultural and natural resources of the District. Some of the costs associated with implementing Alternative B would be offset by the revenue realized from rental of the Appalachian Clubhouse as a day use facility.

However, irreversible and irretrievable commitments of resources would be required for implementation of Alternative B. These commitments would result primarily from removal of most of the historic buildings within the District. Direct, permanent, major, adverse effects to aboveground cultural resources would occur due to removal of many of the historic buildings and loss of landscape characteristics and features (mainly "spatial organization" and "buildings and structures"; see Table 3- 3). In addition, this alternative would result in a change in the use and setting of the cultural landscape. Indirect, minor, adverse effects on the District and its landscape would include wear and tear on features in the Appalachian Clubhouse and other interpretive features in Daisy Town due to increased internal trips to view exhibits. There is also potential for irreversible impacts to archeological resources as a result of implementation of this alternative, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures.

Unavoidable adverse impacts associated with implementing Alternative B are primarily direct, short- term, and negligible and would affect soils, biotic communities, noise, air quality, visitor experience, visitor use, access and circulation, and aesthetics and viewsheds. These effects would be caused primarily by ground disturbance during installation of water lines, sewer lines, and parking areas; increased erosion potential; increases in noise and emissions from construction equipment; and the short- term adverse effects on visual quality and aesthetics during and immediately following construction, prior to reestablishment of vegetation in disturbed areas. Visual quality and aesthetics would experience minor, adverse impacts due to retention of buildings and some cultural landscape components that currently degrade views of the natural environment.

4.5 Impacts of Alternative C, the Preferred Alternative

Alternative C entails the retention of 16 cabins and the Appalachian Clubhouse in Daisy Town, the retention of the Chapman cabin (#38) in Society Hill, and removal of all other historic buildings in the District, either by mechanical means or by hand. Visitation to the District following implementation of Alternative C is not expected to change considerably; however, traffic within the District is expected to increase slightly (Table 4- 6). Existing recreational use would continue to occur. New exhibits are proposed under this alternative and the Elkmont Nature Trail brochure would be updated to include natural and cultural resource information on Elkmont. The Park would continue to implement its existing natural resource management activities.

Some changes to parking and circulation within the District would be required. Once the project related work was completed, a minor increase in operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing.

4.5.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

Implementation of Alternative C would constitute an adverse effect on the Elkmont Historic District, entered in the National Register of Historic Places (NRHP) on March 22, 1994. Alternative C would remove 32 buildings listed as contributing in the NRHP nomination, including the remains of the Wonderland Hotel, the Wonderland Hotel Annex, 27 cabins and 3 garages. The alternative would retain 17 contributing buildings, including the Appalachian Clubhouse and 16 cabins. Also as part of Alternative C, one additional non- contributing cabin would be retained, resulting in a total of 18 buildings retained under Alternative C. The majority of Elkmont's cultural landscape elements and features also would be retained under this alternative.

Of the 32 contributing buildings proposed for removal, 25 buildings were listed as either "Poor" or "Fair to Poor" condition in 2003. Of these same 32, two—the Wonderland Hotel and Cabin #36 —have significant portions that have collapsed and at least four other cabins have significant problems with structural integrity. Because Alternative C proposes the removal of approximately 60 percent of the contributing buildings within the historic district, implementation of the alternative would compromise the overall layout and spatial patterns among the component resources of the historic district, and its integrity would be lost.

Based on consultation with NRHP staff, it has been determined that, following implementation of this alternative, the buildings and landscape features retained at the Appalachian Club (Daisy Town) will constitute a small historic district that is eligible for the NRHP. The name, boundary, and contributing features of this historic district will not be the same as the existing Elkmont Historic District. After Alternative C is implemented, the Park will prepare an amendment to the documentation for the Elkmont Historic District. This additional documentation will accurately reflect the appearance and characteristics of the resources retained within Elkmont. As part of this National Register amendment process, the Park is committed to providing additional documentation along with inclusion of the cultural landscape and significant associated features and elements not included in the original nomination. One purpose of the

amended nomination is to accurately describe the overall significance and integrity of the District, based on the extant resources following implementation of Alternative C.

While the overall effect on the Historic District would be adverse, because Alternative C incorporates the continued use of 18 historic buildings into ongoing Park operations, the long- term preservation of these resources would be guaranteed and would be considered a beneficial effect. This alternative is realistic from a long- term management standpoint and achieves preservation of the core collection of historic resources at the Appalachian Club. This particular area evokes the strongest sense of community within Elkmont and offers the greatest opportunity for visitors to understand the former vacation community and the broad cultural pattern of second- home vacation cabins from the early 20th century. Daisy Town also offers the best cross section of Elkmont's various construction techniques and building materials, as well as preserving the only "set- off" cabins in the Park. The Appalachian Clubhouse would be rehabilitated as a day- use rental for the public. Sixteen historic Daisy Town cabins, the cabin associated with Colonel Chapman located along Jakes Creek in Society Hill, and the historic swimming hole at Little River would be preserved.

The cultural landscape characteristics and features of Elkmont, such as the historic swimming hole at Little River, stone walls and a footbridge over Bearwallow Branch, would be retained under this alternative as would other eligible cultural landscape features. The preservation of the retained cabins and rehabilitation of the clubhouse would be conducted in accordance with *The Secretary of the Interior's Treatment Standards*.

Where adequate documentation is available, all modern, exterior changes made to cabins that post- date 1940, will be restored to a point within the listed period of significance. This includes, but is not limited to, elements such as porch decking, porch posts and rails, modern additions and modern substitutions of original materials.

The Swan cabin (#4), considered non- contributing because it has lost its integrity, will be restored to a point within the period of significance. Conspicuous modern additions will be removed from this building such as the deck, side and rear rooms. Based on available documentation, building features that have been altered, such as the porch, posts, railings and foundation piers, will be restored or recreated to a point within the period of significance. This building will be restored to maintain the spatial relationship of the established streetscape in Daisy Town.

This alternative would introduce new visual elements into the District, including eight wayside exhibits, an orientation kiosk, four parking areas, and paths leading from the parking areas to exhibits. Indirect adverse effects on cultural resources would be minor, but long- term. These indirect effects would be caused by a modest increase in the number of internal trips to the restored buildings, along with wear and tear from pedestrian traffic to the Appalachian Clubhouse and, potentially, on the porches of the retained Daisy Town cabins. Overall visitation and use specified for most buildings and features is primarily interpretive under Alternative C.

The interpretive exhibits, parking areas, new paths and roads, and stream bank stabilization at eroded culverts would create minor adverse effects on cultural resources.

The proposed new elements would constitute a minimal visual change. In addition, the proposed parking areas, paths, and roads would be located in areas already impacted by existing roads, parking areas and modern buildings slated for removal. The proposed utility lines would be buried in the ground, thereby removing visually intrusive power poles that postdate the period of significance.

Archeological Resources

As with all alternatives, the potential for Alternative C to impact archeological resources depends on the level, extent and location of ground- disturbing activities. The Park will implement strategies to avoid or minimize any impacts on archeological resources. Alternative C proposes removal of fewer buildings than the No Action Alternative. However, restoration, rehabilitation and preservation activities could result in ground disturbance in Daisy Town and adjacent to the Chapman (#38) cabin in Society Hill. Installation of new sewer, water and electrical lines to the Appalachian Club and construction of parking areas also would result in additional disturbance that could affect archeological resources. Any such impacts would be direct, long- term, and adverse, and could be major.

The areas where archeological resources could potentially be adversely affected include one locus where significant resources have been documented, six loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at 10 loci. Compared to the No Action Alternative, this alternative may impact two additional loci where potentially significant resources have been identified. Those resources could be adversely affected by installation of the Little River Trail parking area and by installation of a water line. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, the removal of 32 contributing buildings within the NRHP- listed Elkmont Historic District would constitute an adverse effect. The overall integrity of the District would be lost as a result of implementing this alternative. The potential effects to archeological resources under Alternative C could result in a determination of adverse effect.

Proposed mitigation:

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation, and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers, in accordance with the provisions of the National Historic Preservation Act and all other applicable Federal laws and regulations.

Great Smoky Mountains National Park intends to develop comprehensive, scholarly historic contexts for Elkmont, with input from professional scholar- advisors; conduct a comprehensive Cultural Landscape Inventory (CLI); and prepare revised National Register documentation based on the new historic contexts, the CLI, and other relevant research.

The revised National Register documentation will more accurately reflect the resources that will remain and will more fully explore and explain the contribution of the many landscape features to the historic scene at Elkmont. To prepare an amendment, a comprehensive evaluation of all significant contributing features, including buildings and landscape features, will be completed.

A mitigation measure that has been proposed as an option under Alternative C is the retention of Cabin 42, "River Lodge," known also in recent times as the Spence Cabin. Under this proposal, the cabin would be restored on the exterior to a point within the period of significance and rehabilitated on the interior as a day use facility. This cabin is a significant element within the district for its association with the former president of the Little River Lumber Company, Colonel Wilson B. Townsend. The retention of this cabin would bring the total number of buildings retained to 19. Cabin 42 is within an imperiled montane alluvial forest community that is globally significant. Impacts to this forest community from retention of this one building are expected to be minor and within acceptable limits of change.

4.5.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative C would result primarily from ground- disturbing activities associated with building removal and infrastructure modifications. These effects are discussed below for each natural resource.

4.5.2.1 Soils

This alternative proposes removal of 56 buildings total in Elkmont Historic District. As a result, short- term, moderate adverse effects on soils would occur during project implementation if the use of heavy machinery and other demolition equipment is necessary for removal of the buildings. These effects would be mitigated by protocols established by the Park such as permitting only the use of low ground pressure equipment (except for hauling on existing roadways) and removal of buildings by hand in sensitive areas. In addition, all areas where there has been ground disturbance would be seeded with native species following project completion. Therefore, the adverse effects on soils due to demolition activities would be temporary.

Short- term, moderate, adverse effects to soils would occur as a result of installation of new water and sewer lines, underground utility lines, paths, and road repair and construction. All of these activities would require either excavation or grading, resulting in adverse effects to soils over a wider area in the District than in the No Action Alternative. In the long term, since the increase in internal pedestrian trips is likely to be minimal (see Table 4- 7), the soil compaction and related adverse impacts to plants from trampling would be negligible.

Overall, the indirect effect on soils over the long term would be adverse, but minor, resulting from some elimination and some addition of impervious surfaces. A large area of impervious surfaces (1.88 acres) would be eliminated when 56 buildings are removed. Subsequently, rates of runoff and soil erosion would decrease in those areas and long-term beneficial effects on soils and adjacent waterways would be provided. Once vegetation is reestablished in areas formerly occupied by buildings, the plants would

supply additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems.

However, although impervious surfaces would be removed in some areas under this alternative, in other areas, impervious surfaces would be added by the paving of roads and parking areas. Although pervious concrete would be used in parking areas and some infiltration is possible where this material is used (see Section 4.5.2.5), the surface is only able to absorb the first one inch of precipitation and would produce higher rates of runoff than undisturbed, vegetated surfaces. Additional rain water cannot penetrate these surfaces and would runoff onto adjacent soils. The estimated increase in runoff over the existing condition is 0.8 percent (Table 4- 5). This would cause a small increase in soil erosion that could, in turn, result in increased sedimentation into area streams and degradation of water quality due to contamination of runoff with petrochemicals and other contaminants from automobiles. In Society Hill, Alternative C restricts vehicular access along Jakes Creek Road south of Daisy Town by relocating a gate. This provision would provide long- term, minor benefits to Society Hill by eliminating the source of chronic soil disturbance, soil compaction and release of contaminants from automobiles.

4.5.2.2 Biotic Communities

4.5.2.2.1 Terrestrial Plant Communities

Direct, adverse effects to biotic communities would occur during construction as a result of disturbance of vegetation communities by construction equipment. These effects would be negligible and short- term. However, organisms in the District may indirectly experience long- term, major benefits resulting from an increased area and improved quality of habitat for both wildlife and the globally imperiled montane alluvial forest.

Removal of 56 buildings would allow a variety of plant community types to increase. In the Wonderland Club, these communities include Appalachian montane oak- hickory forest and eastern white pine successional forest dominated by eastern hemlock. In Millionaire's Row, the floodplain of Bearwallow Creek contains Appalachian montane oak- hickory forest, early successional Appalachian hardwood dominated by tulip poplar and southern Appalachian cove forest. The occurrence of large sycamore trees in portions of the Little River and tributary floodplains indicates that these floodplain areas contain the heavily impacted montane alluvial forest, a community that is globally imperiled. Tributaries upslope of the Little River floodplain may have many of the same overstory species and may be classified as the same community type, but they typically lack the biological and structural diversity of the floodplain forest located within the floodplain of larger rivers and streams. Removal of buildings throughout floodplain areas and cessation of chronic disturbance would allow for gradual succession back to this forest type.

In Society Hill, forested areas have been considerably disturbed by past human activity. Plant communities present include early successional Appalachian hardwood forest dominated by tulip tree and red maple, with smaller areas of Appalachian montane oak- hickory, southern Appalachian cove, and Virginia pine successional forest communities. The majority of the Daisy Town buildings

are proposed to be retained under Alternative C, which eliminates the potential for expansion of plant communities on those sites. Chronic disturbance would continue in this area of the District, resulting from pedestrian traffic and vegetation management.

Retention of buildings in Daisy Town and the Chapman (#38) cabin in Society Hill would require hazard tree removal beyond that which is done adjacent to trails and within the Elkmont Campground. For historic buildings and grounds which have public access, the Park typically intensely manages the surrounding landscape and, although efforts would be made to retain as much of the forest communities as possible at Elkmont, the initial effort to remove hazard trees around retained structures would be aggressive. Annual maintenance of the perimeter around historic structures would continue to be intensive, thus truncating the age and size distribution by removing hazard trees that are often old or large and subsequently adversely affecting the old growth stage of development. Implementation of Alternative C would increase the need for hazard tree management above that which is currently performed in throughout the District and would adversely affect plant communities primarily throughout Daisy Town. These indirect effects are expected to be minor, but increase incrementally as more buildings are retained because additional hazard tree management would be required. In the remainder of the District, removal of buildings would eventually allow forests to reach the old growth stage of development.

Within the study area, the globally imperiled montane alluvial forest would have an opportunity to expand up to 22 acres (9 hectares) throughout floodplain and wetland areas (see Table 4- 3) once the buildings are removed and hazard tree management is no longer necessary in these areas. Because no work is proposed in floodplains or wetlands under Alternative C, the potential for reestablishment of the montane alluvial forest is the same as that which would occur under the No Action Alternative.

4.5.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative C. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and beneficial, resulting from an increase in the vegetation in abutting plant communities due to increased infiltration and associated decreases in runoff and soil erosion. Once vegetation is restored in areas formerly occupied by buildings, the plants would provide protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems.

4.5.2.3 Threatened, Endangered, Rare and Sensitive Species

Like the No Action Alternative, Alternative C would not directly affect federal- listed endangered or threatened species since none are known to occur within or adjacent to the project implementation area. However, removal of the buildings and restoration of disturbed areas would indirectly provide long- term, minor benefits by eventually expanding and improving wildlife habitat. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*) occur within the District. Implementation of Alternative C would create the potential for existing populations of these species to expand into revegetated areas, with the exception of the Daisy Town area in which buildings are proposed to be retained. Similar benefits would also be provided to state-listed species for which the District contains potential habitat. Those species include running bittercress, rough hawkweed, Fraser's yellow loosestrife, broadleaf bunchflower, yellow nodding lady's tresses, peregrine falcon, common raven, North American river otter, longhead darter, and northern pine snake. Site- specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the Park would consult with the U.S. Fish and Wildlife Service and the state of Tennessee to determine measures to avoid, minimize, or mitigate adverse effects on the species.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*) is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall located within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be negligible. Following project implementation, expansion of the available area for infiltration should provide minor benefits to water quality, indirectly benefiting aquatic species downstream such as the hellbender.

Although it is not a federally or state- listed species, the synchronous firefly that has been observed in the District would likely benefit from expanded habitat in grassy areas at former building sites and along roadways. However, over the long term, without management to sustain those herbaceous habitats, woody vegetation would eventually encroach upon the area, possibly affecting the synchronism of this species. At this time, the role of synchrony in the ecology of this species is poorly understood, so this impact is difficult to quantify.

4.5.2.4 Wetlands

As described in the No Action Alternative, short- term, direct, minor adverse effects to wetlands would occur during project implementation as a result of disturbance to wetland soils within Millionaire's Row. Although protocols have been established to avoid the potential for impacts to sensitive areas, the environment of the wetlands along Bearwallow Branch is not suitable for machine traffic or even heavy pedestrian traffic due to saturated soil conditions. This disturbance would be temporary and further minimized through seeding of native species over disturbed soils. However, wetlands may experience long- term, minor, indirect benefits from the elimination of chronic

disturbances such as those associated with residential properties to be removed within Millionaire's Row.

Implementing Alternative C would also create long- term, minor beneficial effects to wetlands by increasing several wetland functions and values, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, fish/shellfish habitat and recreation. Improving wildlife habitat in areas adjacent to wetlands would enhance the wildlife habitat function by providing additional upland habitat and by increasing botanical diversity. Wildlife species that migrate into areas formerly occupied by buildings would utilize wetland habitat nearby as well. The aesthetic/visual quality value of the wetland would be improved by planting those sites with native plant species. Removal of impervious surfaces would allow greater infiltration adjacent to the wetlands, thereby reducing the demand for flood storage. Both the water quality and subsequently, the fish and shellfish habitat functions would improve due to the increased area available for infiltration and reduction in the area of impervious surfaces. In addition, repair of culverts to correct erosion problems would provide indirect benefits by ensuring that additional erosion and sediment- laden water does not make its way into abutting wetlands or floodplains. As described in the No Action Alternative, the recreational value of the wetlands potentially would also increase because removal of the buildings would provide more opportunities for recreation and activities focused on observation and appreciation of biotic communities.

4.5.2.5 Water Quality

Water quality can be affected by a variety of activities resulting in discharge to surface waters both during and following project implementation. Alternative C would result in changes to surface water runoff rates and volumes and would require additional discharge of treated effluent into the Little River. Potential impacts to water quality resulting from implementation of Alternative C are described below.

The adverse effects on water quality resulting during project implementation are expected to be short- term and negligible, primarily caused by disturbance created by heavy equipment, used to remove buildings and to transport materials into areas in which restoration, rehabilitation and preservation are proposed. Although Best Management Practices would be followed, there would still be potential for erosion in disturbance areas and sedimentation into water bodies to occur during project implementation. However, once the areas are planted and vegetation has become established, a large area (1.99 acres) of impervious surfaces would be eliminated, reducing runoff that could contaminate District waterways and providing long- term, minor benefits to water quality.

All of the proposed infrastructure components (water lines, sewer lines, parking areas) associated with this and other alternatives would be located to minimize the potential for soil erosion and sediment transport to surface waters within the District. Where possible, to minimize potential impacts, pipelines have been planned to be suspended under bridges to cross streams, rather than be placed under the streambed. Where lines cannot be hung from bridges, they would be bored under the streambed, avoiding the potential for disturbance to the stream substrate and potential impacts to water quality.

The need for additional parking areas varies in each alternative with the initial consideration being the expansion, reconfiguration and resurfacing of existing parking areas, where possible, and then constructing new parking areas where beneficial and/or necessary. Areas currently used for parking are not paved and vehicular traffic has resulted in loss of vegetation, soil compaction and erosion. Projected annual rainfall runoff due to pavement runoff is shown in Table 4- 5. A very small (0.8 percent) increase in runoff over the existing condition is expected to occur as a result of implementing Alternative C. This small quantity would have a negligible effect on water quality.

Sewage Treatment and Pollutant Discharge

No change in water quality would result from sewage treatment and pollutant discharge following implementation of Alternative C. The total amount of discharge pollutants remains at baseline levels under Alternative C (see Table 4- 11) and the incremental increase in effluent discharge in this alternative is such that temperature effects are expected to be negligible (McGill Associates 2004). The effluent discharge rate would remain the same as the existing condition under all alternatives. At the current rate of discharge, thermal impacts are dissipated entirely within three feet of the discharge pipe due to effluent mixing with cooler water in the pipe from the plant to the discharge point. Because the cooling would continue and the rate of discharge would remain the same under all alternatives, there would be no thermal impacts to the Little River as a result of implementing this alternative (McGill Associates 2004).

In addition, installation of the sewer line under Jakes Creek to serve the Appalachian Clubhouse would be above the Little River confluence with Jakes Creek to minimize any in- stream impacts to both Jakes Creek and the Little River. Since the Appalachian Club interior would be rehabilitated for day use, public restroom facilities would be required. The additional wastewater associated with this action that would require treatment is estimated at 1,300 gallons per day. This additional wastewater is minor and can be adequately treated within permitted limits without any improvements to the existing treatment plant. Water quality standards for Outstanding National Resource Waters would continue to be met because concentrations of contaminants would remain below the water supply maximum contaminant level (See Table 4- 12). Therefore, rehabilitation and reuse of the Appalachian Clubhouse would have no effect on water quality.

Collective annualized averages for all water quality contaminant constituents under Alternative C were calculated at levels at least 10 times lower and often 100 times lower than the water supply maximum contaminant level (for an estimation of maximum potential impacts under any alternative, see Table 4- 12). Since the estimated contaminant level from runoff is very low, it would also not affect water quality.

4.5.2.6 Floodplains

Like other alternatives that propose removal of buildings, permanent, moderate benefits to the 100- year floodplain would be achieved through removal of any impervious surfaces currently in and adjacent to the floodplain of Bearwallow Branch and the Little River. As described in the No Action Alternative, an increase in the area available for flood storage would be a direct benefit from removal of three buildings in the 100- year floodplain. Use of these three buildings (Miller (#46), Faust (#47), and Faust garage (#47A)) that lie within the 100- year floodplain would be contrary to NPS policy that expressly prohibits development within floodplains and would therefore require a

formal Statement Of Findings if they were retained. According to Director's Order #77-2, the NPS must "avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks".

Another direct benefit would be an increase in the area of associated plant communities, such as the montane alluvial forest, that is expected to regenerate at former building sites. Removing buildings in areas adjacent to floodplains would provide permanent, indirect benefits by increasing the area available for infiltration. Additional indirect benefits would be provided by prohibiting vehicular access to Society Hill and because removal of buildings within and adjacent to floodplains would eliminate future ground disturbance and soil compaction associated with residential use.

4.5.2.7 Air Quality

Air quality can be affected by increases in vehicular traffic and by how this traffic moves throughout the District. Increased engine idling times will generally occur as traffic congestion causes increases in travel time along roadways, within parking areas, at gates, and at destination points that are visible from the roadway, such as at wayside exhibits. Longer idling times result in increased emissions.

As in the No Action Alternative, projected visitation to the District is not expected to change following implementation of Alternative C. However, there would be a temporary increase in emissions due to operation of equipment during project implementation. Therefore, direct adverse effects to air quality would be short- term in duration and negligible, occurring only during construction. These effects could be minimized by reducing equipment idling times, ensuring that all equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September).

Once construction is complete, specifics of this alternative that could affect the quantity of emissions discharged into the District include increased traffic within the District and construction of parking lots in the Appalachian and Wonderland Clubs. The results of an analysis was performed by the Park to evaluate the potential nitrogen deposition and nitrogen dioxide (NO2) impacts from the use of the proposed Appalachian Club and Wonderland Club parking lots show impacts very far below the nitrogen deposition threshold of 0.01 kilograms per hectare per year. The impacts were in the range of one-ten thousands of the nitrogen deposition threshold. The visible haze analysis indicates no visible haze impacts. The maximum impact of nitrogen dioxide to the annual NO2 Class I PSD increment was approximately 0.017 micrograms per cubic meter (ug/m^3), or one- sixth of the EPA Class I significance level (0.1 ug/m^3). A visible plume analysis using the EPA VISCREEN model in the Level 1 mode also indicated that there will not be a visible plume impact from the vehicle emissions.

In an independent air quality assessment performed by McGill Associates based on a busy Saturday in the summer, the emissions of the key air pollutants resulting from the condition created by Alternative C in 2015 are projected to be the same as the existing condition (see Table 4- 8). As a result, no indirect effects to air quality are anticipated to occur as a result of implementing Alternative C.

4.5.3 Impacts on Interpretation and Visitor Use

Implementation of Alternative C requires removal of many of the historic buildings in the District. Removal of the buildings is not expected to change the number of visitors to the area, although there would be a moderate increase in the number of internal visitor trips as compared to the No Action Alternative to areas proposed for interpretive use.

Under Alternative C, the Elkmont Nature Trail brochure would be revised to include historical information about Elkmont, and the Appalachian Clubhouse would be restored for public day use rental. An orientation kiosk with exhibits and eight other wayside exhibits would be installed throughout the District. Another exhibit would be installed inside the Appalachian Clubhouse, and the clubhouse would serve as a self-guiding museum. These provisions would have a direct, long- term, moderate, beneficial effect on interpretation by providing visitors with materials and displays relating specifically to the District.

4.5.3.1 Visitor Experience

Although removal of some of the buildings and restoration and preservation of others is not expected to significantly change visitor use, there would be a change in the level of interpretive efforts. Providing additional historical information in the Elkmont Nature Trail brochure and eight wayside exhibits in addition to those at the orientation kiosk and inside the Appalachian Clubhouse would indirectly have a long- term moderate beneficial effect on visitor experience in the District. The visiting public would have the opportunity to learn about the establishment and history of Elkmont, and the cultural and natural resources of the District. One additional cabin (Chapman (#38)) would be restored in Society Hill, allowing visitors to learn about Colonel Chapman's role in the establishment of the Park. An exhibit in Millionaire's Row discussing the natural history of synchronous fireflies would be included. Installation of interpretive exhibits and updating of trail brochures in Alternative C would indirectly result in long- term, moderate, beneficial effects to the visitor experience by allow visitors to understand what they are viewing in the District and to achieve a sense of time and place associated with the buildings.

Currently, the buildings and adjacent grounds are closed to the public and the present condition of the District allows for multiple opportunities to view the intact cultural landscapes, including the buildings and smaller- scale features, from existing roadways. Thus, the focus on the portion of the District that contains buildings is on investigation and discovery of cultural resources within their setting. If Alternative C was implemented, visitor experience would change to one that balances natural resource restoration with increased cultural resource interpretive opportunities available at wayside exhibits, at cabins retained in Daisy Town and Society Hill, through use of the Appalachian Clubhouse with interior exhibits and retention of cultural landscape elements. The remainder of the District would be restored to native plant communities.

4.5.3.2 Visitor Facilities

Visitor facilities would experience long- term, moderate direct and indirect benefits as a result of implementing Alternative C. Although most of the historic buildings would be removed under this alternative, a variety of visitor facilities would be added as well. A total of eight wayside exhibits, an orientation kiosk with exhibits, and interior exhibits at the Appalachian Clubhouse would be added. These exhibits would provide visitors with

information on the natural environment and interpret the cultural resources. With the addition of the exhibits, visitors would gain another opportunity to understand the history behind establishment of the Town of Elkmont, the history of the Appalachian and Wonderland Clubs and train stations, and to learn about the establishment of the Park and how it affected Elkmont. Exhibits describing the natural and cultural history of the area would be placed strategically to orient visitors as they enter the District and most of the major sections of the District, including the campground.

As a result of implementing Alternative C, additional benefits would be provided by the construction or repaving of four parking areas in the District, repaving or widening several roads, resurfacing of walking paths and restoration and rehabilitation of the Appalachian Clubhouse. In addition, day use and restroom facilities and interior interpretive exhibits would be provided at the Appalachian Clubhouse. These facilities would be accessible to the visiting public, reducing the need for visitors to enter the Elkmont Campground to use facilities there. Some of the areas in which visitors currently park are not paved and are eroded, rutted and generally disturbed. Pervious pavement lots would provide a stable surface for parking while preserving the aesthetic quality of the environment expected by the visiting public in a National Park. Collectively, these modifications would indirectly provide long- term, moderate benefits to visitor facilities by allowing for the opportunity for visitors to view and learn about the remaining Elkmont buildings and cultural landscape components, history of the area, and important figures in the history of the Park.

4.5.4 Impacts on Socioeconomic Environment

Alternative C would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.5.4.1 Population and Environment

Alternative C would have no direct, indirect or cumulative effect on local or regional populations.

4.5.4.2 Land Use

Implementation of Alternative C would indirectly result in long- term, moderate beneficial effects to land use. These effects would be achieved through opening the grounds to the public following removal of some of the buildings and structures and by providing additional opportunities for those uses described in the land use zone designations in the 1982 General Management Plan. Implementation of Alternative C would continue to allow for use of public roadway corridors, accommodations at the existing Park quarters, and picnicking and camping at the Elkmont Campground. Historical and natural resource interpretation would be increased over that which currently offered through installation of a variety of exhibits, retention of some buildings for interpretive uses, including the Chapman cabin in Society Hill, and the Appalachian Clubhouse as a public day use rental facility and self- guiding museum. These uses would be supported by alterations to existing infrastructure including new parking areas and restroom facilities. Internal trips within the District are expected to increase slightly (Table 4- 7); however, overall visitation to the District is not expected to increase relative to the No Action Alternative. Therefore, increased visitor opportunities within the District are not expected to result in land use conflicts (such as traffic congestion, crowding, etc.) if Alternative C is implemented.

4.5.4.3 Access and Circulation

During implementation, Alternative C would create negligible, short- term, adverse effects on access and circulation. The buildings and grounds are currently closed to the public and would remain closed during construction to prevent safety hazards to visitors. As a result, alternate access to trailheads in the District may have to be provided. To avoid impacting campground visitors, construction activities would take place when the campground is closed (December to February). These measures would greatly reduce the potential for adverse effects to access and circulation. During removal of the buildings, construction vehicles would add to visitor traffic to and from the District and might cause minor delays due to the reduced capacity for trucks carrying heavy loads to accelerate.

Once implemented, Alternative C proposes a low intensity of reuse for the District including exterior restoration of cabins in two areas for use as interpretative exhibits. Because the level of redevelopment is low, this alternative would affect access and circulation. An increase in total daily trips is expected to occur under this alternative, from 1,340 in the No Action Alternative to 2,323. Internal pedestrian trips would increase from 431 to 435. These changes in trips are associated primarily with visitors traveling between areas of the District to view exhibits and to use other facilities. A complete comparison of estimated change in volume of trips between alternatives is provided in the Tables 4- 6 and 4- 7 at the end of this chapter.

The level of service is not expected to change along District roadways, and no change in average travel speed, percentage of time spent following or headway between vehicles would be experienced. The potential for pedestrian and vehicle conflicts would be minimized through installation of the Daisy Town path and a gate at the road to Jakes Creek Cemetery. Although the potential for vehicle and pedestrian conflicts would still exist, these proposed modifications would provide added safety to visitors, a long- term, and moderate indirect benefit as compared to the conditions that would remain under the No Action Alternative.

4.5.5 Impacts on Other Resources

4.5.5.1 Viewshed

Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District that still exist are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the conditions of the buildings.

The established baseline for this environmental analysis and the associated visual resource analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for the visual analysis. The buildings within the study area would be considered obstructions to the natural viewshed that would be removed if the General Management Plan (the No Action Alternative) was implemented. As a result, long- term, indirect, minor, adverse effects would be created by retention of most of the Daisy Town buildings, the Appalachian

Clubhouse and the Chapman cabin (#38) on Society Hill. Although retention of these buildings would adversely affect visual quality by obstructing the natural viewshed, some long- term, minor benefits to visual quality and aesthetics would be realized through removal of the remainder of the buildings in the District and increasing the area available for restoration of native plant communities (photos 3 through 6A in Appendix D depict the existing views of a variety of historic buildings and simulations of the potential views following removal of these buildings). In addition to retention of some buildings, Alternative C proposes to retain foundations, rock walls and other cultural landscape components. These components obstruct views of the District's natural resources to a minor extent. Direct, adverse impacts to visual quality and aesthetics are expected to occur during implementation of Alternative C because of the presence of machinery and ground disturbance, these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be long- term, minor, and adverse under Alternative C due to retention of some buildings, structures and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix D) would also be adversely impacted by building retention with regard to the area that is visible from the transportation corridors.

4.5.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during implementation of Alternative C due to construction activities. The high noise levels of combustion- powered equipment, particularly due to earth moving equipment (usually diesel), are expected to be the primary contributor to the sound levels during construction and can interfere with the ability of individuals near the work site and passersby to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The major sources of construction noise in this alternative may include removal of buildings, hauling, grading, and paving. Overall, construction noise is relatively short in duration and would be restricted to daytime hours at the time of year in which visitation is expected to be the lowest.

Following project implementation, it is expected that future noise levels under Alternative C would remain in the range of 50 to 60 dBA. As in the No Action Alternative, since these noise levels do not exceed the noise abatement criteria of 67 dBA, Alternative C would have no long- term effect on noise levels in the District.

4.5.6 Impacts on NPS Operations

In addition to removal of historic buildings, Alternative C includes modifications to existing infrastructure, increasing the number of parking lots and paving with pervious pavement, restoration of cabins for use as interpretive exhibits and restoration and rehabilitation of the Appalachian Club for day use. All of the new visitor facilities, exhibits and infrastructure would have to be maintained by NPS staff. However, the effect of implementing Alternative C on NPS operations would be permanent, moderate and beneficial, primarily because the need to stabilize, maintain and police buildings across the District would be largely eliminated, with the exception of the 16 cabins retained in Daisy Town, the Chapman (#38) cabin in Society Hill and the Appalachian Clubhouse. Therefore, although there are costs associated with restoring and

preserving the remaining buildings and for maintaining the upgraded infrastructure (i.e. cleaning pervious pavement, maintaining exhibits, etc.), this cost would be reduced over the existing condition. The costs of implementing this alternative would also be offset to some extent by the revenue achieved from rental of the Appalachian Clubhouse as a day use facility.

Indirect beneficial effects would result due to removal of the Elkmont buildings. The buildings have the potential to contain hanta virus, a disease spread by rodents, and histoplasmosis, which is spread by bats. Both of these contagions can be fatal to humans who come into contact with them. Some of the buildings contain a variety of debris, ranging from broken glass and fallen plasterboard to lead- based paint. Removal of hazards that pose a danger to the visiting public would remove the potential for harm, reduce the need for NPS law enforcement in the District, and ultimately provide permanent, moderate benefits to NPS operations.

Some of the expenditures required for vegetation management adjacent to the buildings would be eliminated as buildings are removed, indirectly benefiting NPS operations through a reduction in costs associated with staff time and equipment needs. However, the overall indirect effect on NPS operations due to hazard tree and other vegetation management is expected to be long- term, minor and adverse because most areas of the District and the grounds would be open to the public and would require aggressive vegetation management. Because the grounds would be opened to the public, even where buildings are removed the NPS must manage vegetation to provide for visitor safety. Hazard trees adjacent to exhibits, trails and roadways would continue to be removed as needed to reduce the possibility that visitors could be harmed by falling trees.

4.5.7 Cumulative Effects

The cumulative effects of implementing Alternative C would be primarily limited to the District and the Little River watershed. It would add incremental beneficial effects to cumulative effects on wetlands and floodplains by expanding the area available for flood storage in the watershed.

Like all alternatives discussed previously, beneficial cumulative effects would generally be created by removal of buildings and subsequent revegetation throughout the District under Alternative C. Reestablishment of native plant communities provides multiple benefits to the aquatic and terrestrial environment through soil stabilization and reduction in erosion and sedimentation. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from parking area runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Reduction in runoff and elimination of erosion help to lower the potential for contaminants to enter the river. At the same time, revegetation of native plant communities increases the area of available habitat for a variety of flora and fauna, including reestablishment of the globally imperiled montane alluvial forest.

Invasive, non- native plant species thrive in disturbance areas. The spread of these species could be further exacerbated by increased disturbance caused by pedestrian traffic into sensitive areas. Permanent revegetation with native species would create a

beneficial cumulative effect by reducing the area available for invasive, non- native species to become established, thereby decreasing the potential for these species to infiltrate into surrounding areas of the Park. Failing to continue a comprehensive, invasive, non- native species management program at the District could, over time, result in the spread of those species into other areas of the Park adding exponentially to the existing adverse effects that invasive species have on the Park's botanical diversity.

The loss of aboveground cultural resources in Alternative C is significant and would result in a permanent adverse, cumulative effect. While the Park contains a variety of historic buildings and cultural landscape components, the District's buildings represent the only remaining representative group constructed during that period of significance in the Park. Other resort properties representing this time period, such as hotels and lodges inside the Park and hotel and cabin communities outside the Park, have been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would cumulatively result in loss of groupings of buildings representing this period in southern Appalachian history.

4.5.8 Conclusion

Of the seven alternatives, Alternative C was selected as both the environmentally preferred alternative and the agency- preferred alternative because it strikes the best balance between natural resource values and cultural resource values and has a favorable cost- benefit ratio.

In selecting the preferred alternative for the Elkmont Environmental Impact Statement/General Management Plan Amendment, the National Park Service employed the "Choosing By Advantages" or "CBA" decision- making process. This decision-making process analyzed the advantages of each developed alternative and considered the beneficial and negative impacts as described in the EIS in order to quantify and rank total advantages for each alternative. Proposed costs were applied to all ranked alternatives, respectively, and a cost- benefit analysis was conducted. The alternative with the most gains or advantages for the associated cost was then selected as the preferred alternative.

The project alternatives were considered and each was individually assessed under four factors. The four factors assessed were Protection of Natural Resources; Protection of Cultural Resources; Provision for Visitor Education and Enjoyment; and Protection of Public Health, Safety and Welfare.

The decision- making process for selecting the preferred alternative considered all identified factors in order to support and fulfill the purposes of the Park as stated in the enabling legislation. In addition to Park purpose, other laws, policies and guidelines directly relevant to the National Park Service were taken into account as part of the decision- making process. The overall laws and policies guiding National Parks are intended to prevent the loss of resources; maintain and improve the condition of resources; protect public and employee health, safety and welfare; and improve operational efficiency and sustainability. This guidance is intended to safely protect resources while at the same time provide opportunities for enjoyment of the resources to present and future park visitors. Decisions in this Environmental Impact Statement /

General Management Plan Amendment involve both a broad view of the Park as well as issues specific to Elkmont and involve a clear evaluation of gains and benefits for each developed alternative. The analysis of alternatives for each factor was based on direct, indirect and cumulative impacts described in this document.

Implementation of Alternative C would result in maintenance and / or enhancement of the long- term productivity of many of the natural resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, threatened, endangered, rare and sensitive species, and water quality. In general, the overall long- term productivity of all biotic resources would be benefited due to the increase in land available for restoration of native plant communities. Removal of buildings and structures throughout the District, especially within the floodplain along the Little River ("Millionaire's Row" area), would increase the area available for reestablishment of the imperiled montane alluvial forest, a globally significant resource. In addition, restoration of native plant communities would further protect water quality of the Little River, a listed Outstanding National Resource Water.

Cultural resources preserved under this alternative would be enhanced over the long-term; minor to major beneficial effects would be achieved by retaining, and preserving a core group of historic buildings and most cultural landscape characteristics and features. The buildings and landscape features proposed for retention under this alternative represent a realistic and feasible long- range management option for the preservation of Elkmont cultural resources. Preservation of the cabins and rehabilitation of the Appalachian Clubhouse in accordance with The Secretary of the Interior's Standards for the Treatment of Historic Properties would also provide long- term benefits to cultural resources. All work would be carried out under the direction of trained historic preservation specialists.

The expanded interpretive opportunities, providing access to trails and exhibits, and correction of erosion problems at culverts are all beneficial effects. Other areas that would benefit from Alternative C are visitor facilities, land use and visitor experience. Preservation of 16 cabins and rehabilitation of the Appalachian Clubhouse in Daisy Town, as well as preservation of the Chapman cabin on Society Hill, would provide more opportunities for cultural resource interpretation.

Alternative C proposes preservation of the core historic area at Daisy Town. Because of the physical layout and design of buildings and landscape elements such as stone walls and walkways, Daisy Town also provides the best opportunity to demonstrate the historic activities of this club community. This alternative includes the Chapman cabin in Society Hill for its associative value with Colonel David Chapman, who was influential in the establishment of Great Smoky Mountains National Park and proposed under mitigation, the preservation of Cabin 42, "River Lodge" or "Spence Cabin" for the association with the former president of the Little River Lumber Company.

NPS operations would benefit following implementation of this alternative due to the removal of buildings that were built for seasonal use only and suffered from deferred maintenance toward the end of their use by lessees. These buildings currently require substantial NPS staff efforts and funding to stabilize and maintain. The overall long- term effect to NPS operations of retaining 18 buildings would be minor, but adverse due to the

increase in Park staffing required to manage natural and cultural resources as well as visitor use and to provide for visitor safety. However, NPS operations would benefit from the revenue realized as a result of rental of the Appalachian Clubhouse as a day use facility. This revenue would offset some of the long- term operation and maintenance costs associated with implementing Alternative C.

An adverse effect to cultural resources would occur due to removal of 32 contributing buildings and the associated sense of spatial organization and layout. Implementation of Alternative C would create adverse effects to specific cultural resources because historic contributing elements would be removed. The permanent removal of these 32 contributing buildings within the Elkmont Historic District would constitute an irretrievable commitment (i.e., loss) of cultural resources as defined in section 102(c)(v) of the National Environmental Policy Act. A small Historic District within the Appalachian Club portion of Elkmont would remain following the implementation of this alternative.

Natural forest regeneration, as described in the 1982 GMP, would be prevented where selected buildings are retained under this alternative. Removal of all but one cabin in the Millionaire's Row area will allow for substantial regeneration of the particularly significant and imperiled montane alluvial forest. Indirect, minor, adverse effects on Elkmont's cultural resources would include wear and tear to features of the Appalachian Clubhouse and the retained cabins because of increased visitation. There is also potential for irreversible impacts to archeological resources as a result of implementation of this alternative, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures.

4.5.9 Unavoidable Adverse Effects of the Environmentally and Agency Preferred Alternative

As discussed previously, the goals of NPS management for all resources are achieved through consideration of potential resource impacts and identification of a project alternative that balances unavoidable impacts with the goals and objectives for the project. Resource impacts associated with each alternative differ greatly in their context, intensity and duration and this balanced approach considers the merit of all resources equally.

In meeting the goals and objectives for the Elkmont Historic District, some resource impacts are unavoidable because they facilitate other aspects of an alternative designed to achieve certain established goals or objectives for the District. For instance, where above- ground cultural resources are retained, restoration of native plant communities is not possible. Likewise, plant community restoration can be implemented in those areas in which buildings and other cultural components have been removed. The NPS has recommended Alternative C as its Agency Preferred Alternative because it considers the value of all of the District's resources equally, with emphasis on the compatibility of the alternative implementation with the long- term objectives for all resources in the District.

Unavoidable adverse impacts associated with implementing Alternative C are primarily direct, short- term, and negligible and would affect soils, biotic communities, noise, air quality, visitor experience, visitor use, access and circulation, and aesthetics and viewsheds. These effects would be caused primarily by ground disturbance during

installation of water lines, sewer lines, and parking areas; increased erosion potential; increases in noise and emissions from construction equipment; and the short- term adverse effects on visual quality and aesthetics during and immediately following construction, prior to reestablishment of vegetation in disturbed areas.

During construction, air quality and noise levels could be adversely affected resulting from the use of heavy equipment. Likewise, use of this equipment would result in soil disturbance and some damage to vegetation even if construction protocols established by the Park to minimize adverse impacts are followed. These effects are expected to be temporary and limited to the construction period and shortly thereafter until restoration of vegetation occurs. Indirect effects on cultural resources would include wear and tear resulting from increased visitation to features of the Appalachian Clubhouse and other interpretive features in Daisy Town and at the Chapman cabin.

4.6 Impacts of Alternative D

Both options for Alternative D (D1 and D2) entail the retention of 16 cabins and the Appalachian Clubhouse in Daisy Town, the Chapman cabin (#38) in Society Hill, the Spence cabin (#42) in Millionaire's Row, six cabins in the Wonderland Club, and removal of all other historic buildings in the District, either by mechanical means or by hand. The six cabins in the Wonderland area would serve as temporary housing for visiting scientists. In addition, D2 proposes reconstruction of the Wonderland Hotel and rehabilitation of the Annex for use as a curatorial storage facility.

Overall, visitation to the District following implementation of D1 or D2 is expected to increase by an average of 26 visitors per day, plus a maximum additional 18 visiting scientists per day utilizing the temporary housing (see Table 2- 20). The length of an average daily visit and the internal trips within the District are also expected to increase due to the opportunities provided by day use of the Appalachian Clubhouse, the walking tour through Daisy Town, the various exhibits throughout the District, and the Wonderland curatorial facility (under D2). Existing recreational use would continue to occur. New exhibits are proposed under this alternative and the Elkmont Nature Trail brochure would be updated to include natural and cultural information on Elkmont. The Park would continue to implement its existing natural resource management activities.

Some changes to parking and circulation within the District would be required. Once this work was completed, a moderate increase in operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing.

4.6.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

Implementation of Alternative D would result in direct, permanent, major, adverse effects to the aboveground cultural resources of the District, due to removal of 24 contributing buildings under D1 or 22 contributing buildings under D2.

Of the 24 contributing buildings proposed for removal under D1, 22 buildings were listed as "Poor" or "Fair to Poor" condition in 2003. Of these same 22 buildings, two (Wonderland Hotel (#58) and the Knaffl cabin (#36)) have significant portions that have collapsed and at least four other cabins have significant problems with structural integrity.

The cultural landscape characteristics and features of Elkmont, such as the historic swimming hole at Little River, stone walls and a footbridge over Bearwallow Branch, would be retained under this alternative as would eligible cultural landscape features. The preservation of the retained cabins, the rehabilitation of the clubhouse, and if D2 is implemented, the reconstruction of the Wonderland Hotel would be conducted in accordance with *The Secretary of the Interior's Treatment Standards*.

New elements would be introduced into the District, such as the orientation kiosk with exhibits, interior exhibits, eight wayside exhibits, new parking areas, the paths and roads, a flow equalization basin as part of a required wastewater treatment system upgrade,

pumping station access hatches and one electrical control panel, and stream bank stabilization work at the eroded culverts. Long- term, indirect, minor adverse effects on the District would include a modest increase in visitation and traffic congestion, along with wear and tear from increased visitation to the Appalachian Clubhouse, which is proposed as a public day use rental facility and self- guiding museum; visitation to the Wonderland curatorial facility (if D2 is chosen); use of the visiting scientists' temporary housing; and potentially, from visitation to the porches of the retained Daisy Town buildings and the Chapman and Spence cabins.

Alternative D would result in beneficial effects due to the retention of the Appalachian Clubhouse, the 16 Daisy Town cabins, the Chapman and Spence cabins, and the six Wonderland cabins, as well as some of the District's cultural landscape characteristics and features, including a footbridge over Bearwallow Branch. If D2 is implemented, long- term, beneficial effects would be achieved through reconstruction of the Wonderland Hotel (as a contemporary re- creation of the original building) and restoration and rehabilitation of the Annex for Park curatorial storage. The restoration, rehabilitation, preservation and reconstruction of the retained buildings in accordance with *The Secretary's Treatment Standards* would be a minor to major beneficial effect, as would restoration and preservation of the one noncontributing cabin (Swan (#4)) to make it a contributing element.

The nine wayside exhibits, orientation kiosk with exhibits, four parking areas (five if D2 is chosen), new paths and roads, and stream bank stabilization at eroded culverts would create minor, but acceptable adverse effects on cultural resources. The proposed new elements would constitute a minimal visual change District- wide. In addition, the proposed parking areas, paths, and roads would be located in areas already visually impacted by existing infrastructure.

The proposed utility lines would be buried in the ground, thereby removing intrusive power poles that postdate the period of significance. The below- ground pumping stations would not be visible, except for small access hatches placed flush with the ground. The pumping station behind the Wonderland Hotel would have an aboveground electrical control panel roughly two to three feet tall surrounded by a security fence. These minor elements would be designed to be as unobtrusive as possible. The proposed flow equalization basin would be located at the edge of the District adjacent to the modern wastewater treatment plant in an area visually removed from the District's historic buildings. The long- term, indirect, minor effects on the District and its landscape caused by the modest increase in visitor trips to and from the exhibits would not appear to reach the level of adverse effect under Section 106, because overall visitation is expected to increase only slightly and the use specified for the buildings and features is primarily interpretive.

Archeological Resources

As with all alternatives, the potential for Alternative D to impact archeological resources depends on the level, extent and location of ground- disturbing activities. These alternatives propose removal of fewer buildings than the No Action Alternative. However, installation of sewer, water, and electrical lines, parking area construction and road work would result in additional ground disturbance that could affect archeological resources. These impacts would be direct, permanent, and could be major. In addition,

there is the potential for increased visitation and pedestrian traffic to result in site erosion following trampling of the plant cover. Additional site erosion could result in disturbance to shallowly–buried archeological deposits. These impacts would be indirect, permanent and could potentially be minor to moderate. The areas where archeological resources could potentially be adversely affected include one locus where significant resources have been documented, seven loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at nine loci.

Compared to the No Action Alternative, Alternative D could adversely affect three additional loci where potentially significant resources have been identified through construction of the Little River Trail and Wonderland Hotel parking areas, and installation of water and sewer lines. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis. The proper execution of avoidance or protective strategies could ensure that no effect on archeological resources would occur.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, the removal of 22 to 24 contributing buildings within the NRHP- listed Elkmont Historic District would constitute an adverse effect.

As discussed under the previous archeology discussion, the potential effects to archeological resources under Alternative D could also result in a determination of adverse effect if the proper avoidance or protective strategies for archeological resources that could be potentially impacted, as discussed above, are not implemented.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type (s) and cost of the mitigation cannot be calculated at this time.

4.6.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative D would result primarily from ground- disturbing activities associated with building removal and infrastructure modifications. These effects are discussed below for each natural resource.

4.6.2.1 Soils

This alternative proposes removal of a total of 49 buildings in Elkmont Historic District (47 if D2 is chosen). As a result, short- term, negligible adverse effects on soils would occur during project implementation if the use of heavy machinery and other demolition equipment is necessary for removal of the buildings. Short- term, moderate, adverse effects to soils would occur as a result of installation of new water and sewer lines, underground utility lines, road repair and construction and paving operations. All of these activities would require either excavation or grading, resulting in adverse effects to

soils over a wider area in the District than in the No Action Alternative. Impacts occurring during construction would be mitigated by protocols established by the Park to minimize impacts to soils and the adverse effects on soils due to project implementation activities would be temporary.

A large area of impervious surfaces would be eliminated when the buildings are removed (1.64 acres in D1 and 1.17 acres in D2). Subsequently, additional area would be available for surface water infiltration and runoff quantities would decrease in those areas, providing long- term, moderate, beneficial effects to soils. Once vegetation is reestablished in areas formerly occupied by buildings, the plants would supply additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems. The beneficial effects provided by the vegetation would increase as the plants mature.

Although impervious surfaces would be removed in some areas under this alternative, in other areas, impervious surfaces would be added by the paving of roads and parking areas. Additional incremental adverse impacts from soil compaction and trampling of plants would occur due to a small increase in the estimated number of visitors and a modest increase in internal pedestrian trips (see Table 4- 7).

An additional 1.5 acres (D1) and 2.1 acres (D2) are proposed to be covered with pavement. Pervious concrete would be used in parking areas and some infiltration is possible where this material is used. However, the surface would produce higher rates of runoff than undisturbed, vegetated surfaces. The long- term, indirect adverse effects are expected to be minor following implementation of D1, with a 2.2 percent increase in surface water runoff over the existing condition. Surface water runoff would increase by approximately 4.9 percent under D2. This increase in runoff could cause additional soil erosion and subsequent sedimentation of surface waters, resulting in a long- term, indirect, moderate adverse effect on soils. Sediment loading would result in degradation of water quality due to contamination of runoff with petrochemicals and other contaminants from automobiles.

4.6.2.2 Biotic Communities

4.6.2.2.1 Terrestrial Plant Communities

Retention of buildings throughout the District would require hazard tree removal beyond that which is done adjacent to trails and within the Elkmont Campground. For historic buildings and grounds which have public access, the Park typically intensely manages the surrounding landscape and, although efforts would be made to retain as much of the forest communities as possible at Elkmont, the initial effort to remove hazard trees around retained structures would be aggressive. Annual maintenance of the perimeter around historic structures would continue to be intensive, thus truncating the age and size distribution by removing hazard trees that are often old or large subsequently, adversely affecting the old growth stage of development. Implementation of Alternative D would increase the need for hazard tree management above that which is currently performed in the District. These effects would be direct, occurring during project implementation, and indirect as a result of continued hazard tree management. The effects are expected to be moderately adverse, and

would occur over a larger area in these alternatives than in previously discussed alternatives because more buildings are retained. Effects would be incrementally greater if D2 is implemented than D1 due to retention of the Wonderland Hotel and Annex.

Removal of the buildings under Alternative D would allow a variety of plant community types to increase. In Millionaire's Row, the major floodplain contains Appalachian montane oak- hickory forest, early successional Appalachian hardwood dominated by tulip poplar, Appalachian white pine and southern Appalachian cove forest areas could potentially expand. The occurrence of large sycamore trees in portions of the Little River and tributary floodplains indicates that these floodplain areas contain the heavily impacted montane alluvial forest, a community that is globally imperiled. Tributaries upslope of the Little River floodplain may contain many of the same overstory species and may be classified as the same community type, but they typically lack the biological and structural diversity of the floodplain forest located within the floodplain of larger rivers and streams. Removal of buildings throughout floodplain areas and cessation of chronic disturbance would allow for gradual succession back to this forest type. Retention of one building, River Lodge or "Spence Cabin" (#42), and the associated parking area within the montane alluvial forest community, would create moderate impacts directly as a result of hazard tree removal and indirectly as a result of increased visitation and use.

Within the study area, the globally imperiled montane alluvial forest would have an opportunity to expand up to 12 acres (5 hectares) throughout floodplain and wetland areas (see Table 4- 3) once the buildings are removed and hazard tree management is no longer necessary in these areas.

In Society Hill, forested areas experienced considerable disturbance due to past human activity. Plant communities present include early successional Appalachian hardwood forest, dominated by tulip tree and red maple, with smaller areas of Appalachian montane oak- hickory, southern Appalachian cove, and Virginia pine successional forest communities. Most of the buildings in the Wonderland Club and Daisy Town are proposed to be retained, eliminating the potential for expansion of plant communities on those sites. Chronic disturbance would continue in those areas of the District, resulting from pedestrian traffic and vegetation management.

Short- term, moderate, direct adverse effects are expected to occur during construction as well as indirect, long- term, negligible beneficial effects due to building removal following project implementation. During construction, excavation for sewer and water lines would disturb vegetation and most likely require removal of smaller trees and root masses. The use of heavy equipment for removing buildings along with the vehicular and pedestrian traffic would likely cause temporary disturbance of plant communities. Under D2, the activities required to reconstruct the Wonderland Hotel and access to it and the Annex would require ground disturbance for installation of sewer and water lines, and paving of parking areas. Following construction, the expected increase

in visitation, although still modest, and the increase in pedestrian traffic would further increase the stress on plant communities and wildlife habitat.

Although available wildlife habitat could be expanded through removal of many of the buildings, the habitat may not be suitable for a wide variety of species that cannot tolerate the presence of humans and motorized vehicles. Increased visitation would be accompanied by a proportional increase in the improper storage and disposal of food items. Food brought into day use areas and garbage attracts wildlife, increasing the potential for human – wildlife encounters. Encounters with black bears, raccoons and even small rodents can be dangerous for both the human and the wildlife species involved. Increased traffic would also increase the potential for vehicular collisions with wildlife. These impacts on wildlife would be minor because they affect individuals and not entire populations.

4.6.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative D. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and adverse, resulting from an increase in impermeable surfaces and associated runoff into surface waters. Increased visitation will result in trampling of vegetation and loss of soil stability. Increased traffic and parking will result in deposition of petrochemicals, which, when mixed with rainfall runoff, can result in contamination into adjacent aquatic systems.

4.6.2.3 Threatened, Endangered, Rare and Sensitive Species

Alternatives D would have no direct effects on federally- listed threatened or endangered species, since none are known to occur within the proposed project implementation area. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*), occur within the District. Because many of the buildings would be retained under Alternative D and visitation is expected to increase following project implementation, increases in suitable habitat for threatened, endangered, rare and sensitive species are expected to be minor. Although minor increases in their habitat may occur as a result of implementing Alternative D, the increased visitation expected would also elevate the potential for trampling of herbaceous vegetation by pedestrians, indirectly resulting in long- term, minor adverse effects on these species. The chamomile grapefern is especially susceptible to the damage from trampling and the viability of its populations in the District is monitored by the Park for that reason. The state listed species that may benefit due to increased potential habitat include running bittercress, rough hawkweed, Fraser's yellow loosestrife, broadleaf bunchflower, yellow nodding

lady's tresses, common raven, North American river otter, longhead darter, and northern pine snake.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*), is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be negligible. Following project implementation, expansion of the available area for infiltration should provide minor (D1) to negligible (D2) benefits to water quality, indirectly benefiting aquatic species downstream such as the hellbender.

Although it is not a federally or state- listed species, the synchronous firefly that has been observed in the District would likely benefit from expanded habitat resulting from building removal. However, over the long term, without management to sustain those herbaceous habitats, woody vegetation would eventually encroach upon the area, possibly affecting the synchronism of this species. At this time, the role of synchrony in the ecology of this species is poorly understood, so this impact is difficult to quantify.

In addition, the increase in visitation and internal trips within the District could result in long- term, moderate, adverse impacts to portions of firefly habitat as more grassy areas would be trampled by pedestrians.

4.6.2.4 Wetlands

As described in the No Action Alternative, short- term, direct, minor adverse effects to wetlands would occur during project implementation as a result of disturbance to wetland soils within Millionaire's Row. The environment of the wetlands along Bearwallow Branch is not suitable for machine traffic or even heavy pedestrian traffic due to saturated soil conditions. This disturbance would be temporary and further minimized through seeding of native species over disturbed soils. However, wetlands may experience long- term, minor, indirect benefits from the elimination of chronic disturbances such as those associated with residential properties to be removed within Millionaire's Row.

Implementing Alternative D would also create long- term, minor, indirect benefits by increasing several wetland functions and values, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, fish/shellfish habitat and recreation. Improving the wildlife habitat in areas adjacent to wetlands would increase the wildlife habitat function by providing additional upland habitat and by increasing the botanical diversity. Wildlife species that migrate into areas that were formerly occupied by buildings would utilize wetland habitat nearby as well.

The aesthetic/visual quality value of the wetland would be improved by planting disturbed sites with native plant species. Removal of impervious surfaces (1.64 acres in D1 and 1.17 acres in D2) would allow greater infiltration adjacent to the wetlands, thereby reducing the demand for flood storage. Both the water quality and subsequently, the fish and shellfish habitat functions would improve due to the increased area available for

infiltration and reduced area of pervious surfaces. The recreational value of the wetlands would increase because, for many people, removal of the buildings would make the area more attractive for recreational activities such as fishing and hiking.

4.6.2.5 Water Quality

Implementation of Alternative D could potentially affect water quality due to activities resulting in discharge to surface waters both during and following project completion. Changes to surface water runoff rates and volumes would occur and additional discharge of treated wastewater into the Little River would be required. Potential impacts to water quality resulting from implementation of Alternative D are described below.

Short- term, negligible, adverse effects to water quality could occur during construction as additional ground disturbance takes place during removal of the buildings and installation of water and wastewater distribution pipes. Although Best Management Practices would be followed, there would still be potential for erosion and sedimentation into water bodies to occur during project implementation.

Following construction, long- term minor beneficial effects would result from implementing D1 due to an increase in area available for infiltration (1.64 acres). If D2 was implemented, the long term effects to water quality would also be beneficial, but negligible because there would be an overall net increase of impervious surfaces (0.93 acres).

Sewage Treatment and Pollutant Discharge

Alternative D includes rehabilitation of the Appalachian Club interior for day use, which requires public restroom facilities, temporary housing for visiting scientists in the Wonderland Club cabins and a curatorial facility in the Wonderland Hotel and Annex (if D2 is chosen). The additional wastewater treatment for these improvements, including public restroom facilities for the Appalachian Club, is estimated at 2,268 and 3,635 gallons per day for D1 and D2, respectively. Although these additional daily flows would not stress the hydraulic capacity of the treatment plant, they would increase the erratic diurnal flow pattern with much of the daily flow entering the plant during peak flow times during each day. This would be resolved by the construction of a flow equalization basin at the head of the plant that would receive the daily flow and release it into the plant at a constant rate. This is the only improvement to the wastewater treatment plant necessary to support Alternative D. Water quality standards for Outstanding National Resource Waters would continue to be met because concentrations of contaminants would remain below the water supply maximum contaminant level (See Table 4- 12). There are not any baseline conditions established for thermal loading, other than typical wastewater temperatures of 60 degrees Fahrenheit (see Section 2.2.1); however, the incremental increase in effluent discharge if Alternative D was implemented would be such that temperature effects are expected to be negligible (McGill Associates 2004). The effluent discharge rate would remain the same as the existing condition under all alternatives. At the current rate of discharge, thermal impacts are dissipated entirely within three feet of the discharge pipe due to effluent mixing with cooler water in the pipe from the plant to the discharge point. Because the cooling would continue and the rate of discharge would remain the same under all alternatives, there would be no thermal impacts to the Little River as a result of implementing this alternative (McGill

Associates 2004). Therefore, the wastewater generated by rehabilitation and reuse of the Appalachian Club, some of the cabins and (if D2 is chosen) the Wonderland Hotel and Annex would have no effect on water quality.

The new sewer line to be installed under Jakes Creek to serve the Appalachian Clubhouse would be located above the Little River's confluence with Jakes Creek. The line would be placed in this location to minimize any in- stream impacts to both Jakes Creek and the Little River. Other wastewater components required under Alternative D include additional gravity sewer lines, low pressure sewer force mains, sewage pump station and grinder pumps behind cabins used for temporary housing. Installation of these sewage system components would require additional ground disturbance that would increase the potential for temporary impacts to water quality. However, many of these components would be installed in areas along roadsides that have already been impacted. After vegetation has become reestablished in those areas, the potential for erosion and sedimentation from the ground disturbance would be reduced or eliminated. Therefore, there would be no long- term effect on water quality as a result of installing these wastewater treatment components.

4.6.2.6 Floodplains

Like other alternatives that propose removal of buildings, permanent, indirect, moderate benefits to the 100- year floodplain would be achieved through removal of any impervious surfaces currently in and adjacent to the floodplain of Bearwallow Branch and the Little River. An increase in the area available for flood storage (3,520 sf) would be a direct benefit from removal of three buildings in the floodplain and their associated impervious surfaces. Use of these three buildings (Miller (#46), Faust (#47), and Faust garage (#47A)) that lie within the 100- year floodplain would be contrary to NPS policy that expressly prohibits development within floodplains and would therefore require a formal Statement Of Findings if they were retained. According to Director's Order #77-2, the NPS must "avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks".

Another direct benefit would be an increase in the area of associated plant communities, such as the montane alluvial forest, that is expected to regenerate at former building sites. Removing buildings in areas adjacent to floodplains would provide indirect benefits by increasing the area available for infiltration. Additional indirect benefits would be created because removal of buildings within and adjacent to floodplains would eliminate the potential for future ground disturbance and soil compaction associated with residential use.

4.6.2.7 Air Quality

As in the No Action Alternative, there would be a temporary increase in emissions under Alternative D due to operation of equipment during project implementation. These direct, adverse effects to air quality would be short- term in duration and negligible, occurring only during construction. These effects could be minimized by reducing equipment idling times, ensuring that all equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September).

Following project implementation, air quality can be affected by increases in vehicular traffic and by how this traffic moves throughout the District. Increased engine idling times will generally occur as traffic congestion causes increases in travel time along roadways, within parking areas, at gates, and at destination points that are visible from the roadway, such as at wayside exhibits. Longer idling times result in increased emissions.

Visitation and internal vehicular trips are expected to rise under Alternative D (see Table 4- 8). The results of an analysis was performed by the Park to evaluate the potential nitrogen deposition and nitrogen dioxide (NO2) impacts from the use of the proposed Appalachian Club and Wonderland Club parking lots show impacts very far below the nitrogen deposition threshold of 0.01 kilograms per hectare per year. The impacts were in the range of one- ten thousands of the nitrogen deposition threshold. The visible haze analysis indicates no visible haze impacts. The maximum impact of nitrogen dioxide to the annual NO2 Class I PSD increment was approximately 0.017 micrograms per cubic meter (ug/m^3), or one- sixth of the EPA Class I significance level (0.1 ug/m^3). A visible plume analysis using the EPA VISCREEN model in the Level 1 mode also indicated that there will not be a visible plume impact from the vehicle emissions.

In an independent air quality assessment performed by McGill Associates based on a busy Saturday in summer, this projected increase in traffic is expected to result in an annual 2.92- ton increase of NOx emissions and a 4.01- ton increase in VOCs emissions in 2015. This increase in VOCs emissions is less than 5 tons per year over the existing condition, resulting in indirect, long- term, minor adverse effects on air quality under Alternative D.

4.6.3 Impacts on Interpretation and Visitor Use

4.6.3.1 Visitor Experience

The direct and indirect effects on visitor experience would be long- term, major, and beneficial, created primarily through removal of buildings, restoration and preservation of others, and installation of cultural and natural resource interpretive media. Most of the cabins would be restored in Daisy Town, allowing visitors to experience most of this section of the District in its historical context. The Chapman (#38) cabin would be restored in Society Hill and a wayside exhibit installed allowing visitors to learn about Colonel Chapman's role in the establishment of the Park. The Spence cabin (#42) in Millionaire's Row would be restored and a wayside exhibit installed. An exhibit in Millionaire's Row discussing the natural history of synchronous fireflies would also be added.

Visitor experience is expected to change considerably as a result of implementing Alternative D. Although removal of some of the buildings and restoration and preservation of others is not expected to significantly change visitor use, there would be a change in the level of interpretive efforts. Providing additional historical information in the Elkmont Nature Trail brochure, the orientation kiosk, exhibits inside the Appalachian Clubhouse, and nine wayside exhibits would likely have a beneficial effect on visitor experience in the District. The visiting public would have the opportunity to learn about the history of the Appalachian and Wonderland Clubs and train stations, the use of Daisy Town as a summer resort area, Colonel Townsend's role in establishment of

Elkmont, and other cultural and natural resources of the District. The exhibits and updating of the trail brochure in Alternative D would allow visitors to understand what they are viewing in the District and to achieve a sense of time and place associated with the buildings. These types of interpretive materials are not currently available throughout the District and their installation is expected to provide long- term, moderate, benefits to the visitor experience.

In addition to these interpretive efforts, the general public would also have the opportunity to participate in structured resource education programs offered by NPS staff. The programs would be free to the public and would focus on natural and cultural history. While the Millionaire's Row and the majority of the Society Hill buildings would be removed, restoration of native plant communities would be undertaken in these areas following construction. Thus, visitors would also have the opportunity to view natural communities and interpret natural succession as well.

4.6.3.2 Visitor Facilities

Visitor facilities would experience long- term, direct and indirect moderate benefits as a result of implementing Alternative D. Although 22 to 24 contributing buildings would be removed under this alternative, a variety of visitor facilities would be added. An orientation kiosk with exhibits, nine wayside exhibits and one interior exhibit would be installed. These exhibits would provide visitors with information on the natural environment and interpret the cultural resources. With the addition of the exhibits and the reconstructed Wonderland Hotel (D2), visitors would gain the ability to understand the history behind establishment of the Town of Elkmont, the history of the Appalachian and Wonderland Clubs and associated train stations, the establishment of the Park and how it affected Elkmont, and to view and learn about the Park's curatorial collection. Exhibits describing the natural and cultural history of the area would be placed strategically to orient visitors as they enter the District and most of the major sections of the District, including the campground.

As a result of implementing Alternative D, additional benefits would be provided by the construction or repaving of up to five parking areas in the District, repaving roadways, and resurfacing or creation of pathways. Some of the areas currently utilized by visitors to park are currently not paved and are eroded, rutted and generally disturbed. Creation of pervious pavement lots would provide a stable surface for parking while preserving the aesthetic quality of the environment expected by the visiting public in a National Park.

In addition, day use and restroom facilities would be provided at the Appalachian Clubhouse under Alternative D. Restroom facilities would also be added at the reconstructed Wonderland Hotel under D2. These modifications would provide a long-term, moderate benefit to visitor facilities.

4.6.4 Impacts on Socioeconomic Environment

Alternative D would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.6.4.1 Population and Environment
Alternative D would have no direct, indirect or cumulative effect on local or regional populations.

4.6.4.2 Land Use
Implementation of Alternative D would indirectly result in long- term, moderate beneficial effects to land use. These effects would be achieved through opening the grounds to the public following removal of some of the buildings and structures and by providing additional opportunities for those uses described in the land use zone designations in the 1982 General Management Plan. Implementation of Alternative D would continue to allow for use of public roadway corridors, accommodations at the existing Park quarters, and picnicking and camping at the Elkmont Campground. Historical and natural resource interpretation would be increased over that which is currently offered through installation of a variety of exhibits, retention of some buildings for interpretive uses, and the Appalachian Clubhouse as a public day use rental facility and self- guiding museum. Housing for visiting scientists would be provided in one portion of the District and, in D2, curatorial storage would be provided at the Wonderland Hotel, fulfilling Park administrative needs.

These uses would be supported by alterations to existing infrastructure, including new parking areas, restroom facilities, and other infrastructure such as electric, sewer and water connections. Internal trips within the District are expected to increase, as is overall visitation to the District (see Tables 4- 6 and 4- 7). However, increased visitor opportunities within the District are not expected to result in land use conflicts (such as traffic congestion, crowding, etc.) if Alternative D is implemented.

4.6.4.3 Access and Circulation
Alternative D proposes moderate intensity of reuse, including temporary housing for visiting scientists only at cabins in one area of the District, interior preservation and exterior restoration of cabins in other areas for use as interpretative exhibits and a curatorial facility at the Wonderland Hotel (if D2 is chosen). During implementation, Alternative D would create short- term, direct, minor adverse effects on access and circulation. Although the buildings and grounds would remain closed during construction to prevent safety hazards to visitors, alternate access to trails in the area may need to be provided. To avoid impacting campground visitors, construction activities would take place when the campground is closed (December to February). These measures would greatly reduce the potential for adverse effects to access and circulation. During removal of the buildings, construction vehicles would add to visitor traffic to and from the District and could cause minor delays due to the reduced capacity for trucks carrying heavy loads to accelerate.

An increase in visitation is expected to occur under this alternative, with total daily vehicle trips increasing from 1,340 in the No Action Alternative to 2,462 and 2,618 in D1 and D2, respectively. Internal pedestrian trips would increase from 431 to 447 in D1 and 479 in D2. A complete comparison of estimated change in volume of trips between alternatives is provided in Tables 4- 6 and 4- 7 at the end of this chapter. To alleviate potential conflicts between vehicles and pedestrians, a number of roadway modifications are included. The potential for pedestrian and vehicle conflicts would be minimized through resurfacing of an overgrown pathway in Daisy Town and relocation of a gate on

Jakes Creek Road to just south of the intersection with Jakes Creek Cemetery Road. Although the potential for vehicle and pedestrian conflicts would still exist, these proposed modifications would provide added safety to visitors, a benefit as compared to the conditions which would remain under the No Action Alternative. However, even with roadway and access modifications, the Level of Service in some areas would be reduced (from A to B). The Level of Service describes operational conditions within a traffic stream, with Level A representing free flow traffic, up to Level F in which traffic delays can be severe. A change from Level A to Level B would result in a decrease in average travel speed, increased percentage of time spent following and reduced headway between vehicles. Therefore, Alternative D would have indirect, long- term, moderate adverse effect on access and circulation.

4.6.5 Impacts on Other Resources

4.6.5.1 Viewshed

Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District that still exist are from existing roadways and trails and buildings. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the condition of the buildings.

The established baseline for this environmental analysis and the associated visual analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for visual analysis. Buildings within the study area are considered obstructions to the natural viewshed that would be removed if the General Management Plan (the No Action Alternative) was implemented. As a result, long- term, indirect, moderate, adverse effects would be created by retention of most of the Daisy Town buildings, the Appalachian Clubhouse, the Chapman cabin (#38) on Society Hill, and buildings in the Wonderland Club (including the reconstructed Wonderland Hotel and restored / rehabilitated Annex under D2). Although retention of these buildings would adversely affect visual quality by obstructing the natural viewshed, some long- term, minor benefits to visual quality and aesthetics would be realized through removal of the remainder of the buildings in the District and increasing the area available for restoration of native plant communities (photos 3 through 6A in Appendix D depict the existing views of a variety of historic buildings and simulations of the potential views following removal of these buildings). In addition to retention of some buildings, Alternative D proposes to retain foundations, rock walls and other cultural landscape components that also pose a minor obstruction to views of the District's natural resources. Although direct, adverse impacts to visual quality and aesthetics are expected to occur during implementation of Alternative D because of the presence of machinery and ground disturbance, these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be long- term, moderate, and adverse under Alternative D due to retention of some buildings, structures and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix

D) would also be adversely impacted by building retention with regard to the area that is visible from the transportation corridors.

4.6.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during implementation of Alternative D due to construction activities. The high noise levels of combustion- powered equipment, particularly due to earth moving equipment (usually diesel), are expected to be the main contributor to the sound levels during construction and can interfere with the ability of individuals near the work site and passersby to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The primary sources of construction noise in this alternative may include removal of buildings, hauling, grading, and paving, as well as noise from restoration and rehabilitation of buildings and construction of new facilities. Overall, construction noise is relatively short in duration and would be restricted to daytime hours at the time of year in which visitation is expected to be the lowest.

Following implementation of Alternative D, future noise levels are expected to remain in the average range of 50 to 60 dBA, with maximum levels (over short periods of time) exceeding 70 dBA for loud vehicles. As in the No Action Alternative, since the average noise levels do not exceed the noise abatement criteria of 67 dBA, Alternative D would not affect noise in the District over the long term.

4.6.6 Impacts on NPS Operations

In addition to removal of historic buildings, Alternative D includes modifications to existing infrastructure, increasing the number of parking lots and paving with pervious pavement, restoration of cabins for use as interpretive exhibits and restoration and rehabilitation of the Appalachian Clubhouse as a public day use rental facility. The Wonderland Hotel would be reconstructed and the Wonderland Annex rehabilitated under D2. All of the new visitor facilities, exhibits and infrastructure would have to be maintained by NPS staff. The effect of implementing Alternative D on NPS operations would be permanent, moderate and beneficial, primarily because the need to stabilize, maintain and police buildings across the District would be largely eliminated, with the exception of the 16 cabins retained in Daisy Town, the Chapman (#38) cabin in Society Hill, the Appalachian Clubhouse, the Spence cabin (#42) in Millionaire's Row, and the six cabins in the Wonderland area. There is cost associated with restoring and preserving the remaining buildings and for maintaining the upgraded infrastructure (i.e. cleaning pervious pavement, maintaining exhibits, etc.). Additional funding and personnel would also be required under D2 to operate the curatorial storage facility. The need for law enforcement may increase slightly as a result of traffic conflicts that could occur with the estimated increases in internal trips within the District. Law enforcement needs are expected to change significantly to the extent that housing and funding for a ranger (level GS- 9) would be required to police the exhibits and curatorial facilities. Costs associated with implementation of Alternative D would be offset to some extent by revenue achieved from rental of the Appalachian Clubhouse as a public day use rental facility.

Some expenditures required for vegetation management adjacent to the buildings would be eliminated as buildings are removed, indirectly creating a permanent, moderate

benefit for NPS operations through a reduction in costs associated with staff time and equipment needs. However, the overall indirect effect on NPS operations due to hazard tree and other vegetation management is expected to be long- term and moderately adverse because most areas of the District and the grounds would be open to the public and would require aggressive vegetation management. Even where buildings are removed, the NPS must still manage vegetation to provide for visitor safety and hazard trees adjacent to exhibits, trails and roadways would continue to be removed as needed to reduce the possibility that visitors could be harmed by falling trees.

4.6.7 Cumulative Effects

The loss of aboveground cultural resources in Alternative D is significant and would result in a permanent, adverse, cumulative effect. While the Park contains a variety of historic buildings and cultural landscape components, the District's buildings represent the only remaining representative group constructed during that period of significance in the Park. Other resort properties representing this time period, such as hotels and lodges inside the Park and hotel and cabin communities outside the Park, have been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would cumulatively result in loss of groupings of buildings representing that period in southern Appalachian history.

Beneficial cumulative effects would generally be created by removal of buildings and subsequent restoration of plant communities throughout a portion of the District. The impacts of implementing Alternative D on the 100- year floodplain and wetlands would be primarily limited to the District and the Little River watershed. Some beneficial cumulative effects on wetlands and floodplains would be realized by expanding the area available for flood storage in the watershed. Reestablishment of native plant communities provides multiple benefits to the aquatic and terrestrial environment through soil stabilization and reduction in erosion and sedimentation. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from parking area runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Reduction in runoff and elimination of erosion help to lower the potential for contaminants to enter the river. In addition, removal of some of the buildings would allow for reestablishment of the globally imperiled montane alluvial forest.

The increased visitation and internal traffic within the District to view exhibits adversely affects air quality. The effect of increases in NOx and VOC emissions resulting from implementation of Alternative D is very small when compared to overall emissions in the Park and in the region. However, because the entire Park is designated a non- attainment area and a Class I area under the Clean Air Act (the highest level of air quality protection) even a small increase adds to already degraded air quality and constitutes a long- term adverse cumulative effect.

Invasive, non- native plant species thrive in disturbance areas. The spread of these species could be further exacerbated by increased disturbance caused by pedestrian traffic into sensitive areas. Permanent revegetation with native species would create a beneficial cumulative effect by reducing the area available for invasive, non- native species to become established, thereby decreasing the potential for these species to

infiltrate into surrounding areas of the Park. Failing to continue a comprehensive, invasive, non- native species management program at Elkmont Historic District could, over time, result in the spread of those species into other areas of the Park, adding exponentially to the existing adverse effects that invasive species have on the Park's botanical diversity.

4.6.8 Conclusion

Implementation of Alternative D would result in negligible to minor enhancement of the long- term productivity of some natural resources including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, and water quality. In general, in D1, the overall long- term productivity of biotic resources would be benefited due to the increase in land available for restoration of native plant communities. This effect would be diminished in D2 due to elimination of potential for native plant community reestablishment at the Wonderland Hotel and Annex sites. Removal of buildings and structures in the portion of the District located within the 100- year floodplain of the Little River would also increase the area available for reestablishment of the globally imperiled montane alluvial forest. However, there would be an irreversible commitment of resources due to elimination of up to 12 acres of potential montane alluvial forest habitat where buildings are retained.

Restored vegetation adjacent to floodplains, wetlands and tributaries would protect water quality of the Little River, an Outstanding National Resource Water. NPS operations would also benefit following implementation of D1 due to the removal of buildings that currently require NPS staff and funding to maintain and stabilize. Additional costs associated with implementation of Alternative D would be offset to some extent by revenue realized from rental of the Appalachian Clubhouse as a public day use rental facility. However, the overall long- term effect to NPS operations would be moderately adverse due to the increase in hazard tree management required to provide for visitor safety throughout the District. Land use would benefit from increased interpretive opportunities, visiting scientist housing and, under D2, the curatorial facility when the District grounds are opened following construction activities.

Cultural resources would also be enhanced as direct, long- term minor to major beneficial effects would result by retaining, restoring and preserving some historic buildings including the Appalachian Clubhouse, the 16 Daisy Town cabins, the Spence (#42) and Chapman (#38) cabins, six cabins in the Wonderland Club, and by retaining some of the District's cultural landscape characteristics and features. Reconstruction of the Wonderland Hotel and rehabilitation of the Annex under D2 would provide direct benefits to cultural resources and to visitor use facilities. Treatment of the retained buildings in accordance with *The Secretary's Treatment Standards* would create a beneficial effect, as would the restoration and preservation of one noncontributing cabin (Swan (#4)) to make it contributing element. Retention of these features would also provide more opportunities for cultural resource interpretation and curatorial storage and display.

The expanded interpretive opportunities, providing access to trails and exhibits, and correction of erosion problems at culverts are all beneficial effects. Other areas that would benefit from Alternative D are visitor facilities and visitor experience.

Irretrievable commitments of resources would result if Alternative D is implemented. These commitments would be created primarily by removal of almost one half of the contributing buildings and would constitute a direct, permanent, major, adverse effect to aboveground cultural resources within the District and loss of cultural landscape characteristics and features (mainly "spatial organization" and "buildings and structures"; see Table 3- 3). In addition, this alternative would result in a change in the use and setting of the District and cultural landscape. Indirect, minor, adverse effects on the District and landscape would include wear and tear on features in the Appalachian Clubhouse and other interpretive features in Daisy Town and at the Chapman cabin (#38) due to increased internal trips to view exhibits.

Alternative D would create direct, major, permanent adverse effects to a portion of the cultural resources. There is also potential for irreversible impacts to archeological resources as a result of implementation of these alternatives, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures.

Some unavoidable adverse impacts associated with implementing Alternative D are direct, short- term, and negligible and would affect soils, biotic communities, noise, air quality, visitor experience, visitor use, access and circulation, and aesthetics and viewsheds. These effects would be caused primarily by ground disturbance during installation of water lines, sewer lines, and parking areas; increased erosion potential; increases in noise and emissions from construction equipment; and the short- term, adverse effects on visual quality and aesthetics during and immediately following construction, prior to reestablishment of vegetation in disturbed areas.

Additional costs to NPS operations would be required for staffing and maintenance of the curatorial facilities (under D2), maintenance of the visiting scientist housing, and additional law enforcement to deal with the impacts of increased visitation.

4.7 Impacts of Alternative E

Alternative E entails the retention of 16 cabins and the Appalachian Clubhouse in Daisy Town, the Chapman cabin (# 38) in Society Hill, six cabins and one garage in Millionaire's Row, seven cabins in the Wonderland Club, and removal of all other historic buildings in the District, either by mechanical means or by hand. Foundations, chimneys, stone walls, and other cultural landscape features would remain in place wherever they would not pose a safety hazard to visitors. In addition, E2 proposes reconstruction of the Wonderland Hotel and rehabilitation of the Annex for public lodging.

Overall, day- use visitation as a result of implementing Alternative E is expected to increase by an average of 26 visitors per day (see Table 2- 20), plus up to 22 visiting scientists and 57 guests utilizing overnight lodging (109 guests for E2). The length of an average daily visit is also expected to increase due to the opportunities provided by day use of the Appalachian Clubhouse, the walking tour through Daisy Town, the various exhibits throughout the District, visiting scientist housing in Millionaire's Row, and public lodging in the Wonderland cabins. Public lodging would also be provided in the reconstructed Wonderland Hotel and rehabilitated Annex under E2. Existing recreational use would continue to occur. New exhibits are proposed under this alternative and the Elkmont Nature Trail brochure would be updated to include natural and cultural information on Elkmont. The Park would continue to implement its existing natural resource management activities.

Some changes to parking and circulation within the District would be required. Once this work was completed, a moderate increase in operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing.

4.7.1 Impacts on Cultural Resources

Buildings and Cultural Landscape

Implementation of Alternative E would result in direct, permanent, moderate, adverse effects to the aboveground cultural resources of the District, due to removal of 19 contributing buildings under E1 or 17 contributing buildings under E2. Depending on the option selected within this alternative, 30 or 31 contributing buildings, including the Appalachian Clubhouse, would be retained under Alternative E, and a reconstructed Wonderland Hotel and a restored/rehabilitated Annex could be utilized if E2 is chosen. The majority of Elkmont's cultural landscape features and the overall District setting would be retained under this alternative.

Of the 19 contributing buildings proposed for removal under E2, 17 buildings were listed as "Poor" or "Fair to Poor" condition in 2003. Of these same 17, two –the Wonderland Hotel and Cabin #36 –have significant portions that have collapsed and at least three other cabins have significant problems with structural integrity.

The cultural landscape characteristics and features of Elkmont, such as the historic swimming hole at Little River, stone walls and a footbridge over Bearwallow Branch, would be retained under this alternative as would eligible cultural landscape features. The preservation of the retained cabins, the rehabilitation of the clubhouse, and if E2 is

implemented, the reconstruction of the Wonderland Hotel would be conducted in accordance with *The Secretary of the Interior's Treatment Standards*.

New visual elements would be introduced into the District, such as the orientation kiosk, ten wayside exhibits, the four parking areas (six if E2 is chosen), the paths and roads, a replacement bridge (if E2 is chosen), the pumping station access hatches and one electrical control panel, the well house, the flow equalization basin and the stream bank stabilization work at the eroded culverts.

Indirect, long- term, moderate, adverse effects on the District would result from the projected increase in visitation and traffic congestion, along with wear and tear from increased pedestrian traffic at the Appalachian Clubhouse, the Wonderland Hotel and Annex, the Wonderland cabins, the visiting scientists' temporary housing at Millionaire's Row, and, potentially, at the porches of the retained Daisy Town buildings and the Chapman cabin (#38).

Long- term beneficial effects would include retention of the Appalachian Clubhouse as a public day use rental facility and self- guiding museum, 16 Daisy Town cabins, Chapman cabin (#38), six cabins and one garage on Millionaire's Row, and the seven Wonderland cabins; reconstruction of the Wonderland Hotel, (as a contemporary re- creation of the original building) and restoration and rehabilitation of the Annex (if E2 is chosen); and retention of most of the District's cultural landscape characteristics and features. Restoration, rehabilitation, preservation, and reconstruction of the retained buildings in accordance with *The Secretary's Treatment Standards* would provide a direct, long- term, minor to major beneficial effect, as would the restoration of one noncontributing cabin (Swan (#4)) to a point within the period of significance based on available documentation.

The interpretive exhibits, parking areas, new paths and roads, a replacement bridge, and stream bank stabilization at eroded culverts would create minor, adverse effects on cultural resources. The proposed new elements would constitute a minimal visual change District- wide. In addition, the proposed parking areas, paths, roads, and bridge would be located in areas already visually impacted by existing roads, paths, parking areas, and a noncontributing bridge.

The proposed utility lines would be buried in the ground, thereby removing intrusive power poles that postdate the period of significance. The belowground pumping stations would not be visible, except for small access hatches placed flush with the ground. The pumping station behind the Wonderland Hotel would have an aboveground electrical control panel roughly two to three feet tall surrounded by a security fence. These minor elements would be designed to be as unobtrusive as possible. The proposed well house would be small in size and located away from the District buildings in an area where it could be screened. The proposed flow equalization basin upgrade to the wastewater treatment plant would be located at the edge of the District adjacent to the modern wastewater treatment plant, in an area visually removed from the District's buildings.

The long- term, indirect effects on the District and its landscape caused by the increase in visitation and traffic congestion, as well as wear and tear on buildings and landscape

features, could reach the level of adverse effect, due to the numbers of visitors and vehicles projected and the more intensive use proposed for many of the buildings and features slated for retention.

Archeological Resources

As with all alternatives, the potential for Alternative E to impact archeological resources depends on the level, extent and location of ground- disturbing activities. This alternative proposes removal of fewer buildings than the No Action Alternative. However, installation of sewer, water, and electrical lines, parking area construction and paving activities would result in additional ground disturbance that could affect archeological resources. These impacts would be direct, permanent, and could be major. In addition, there is the potential for increased visitation and pedestrian traffic to result in site erosion following trampling of the plant cover. Additional site erosion could result in disturbance to shallowly–buried archeological deposits. These impacts would be indirect, permanent and could potentially be minor to moderate. The areas where archeological resources could potentially be adversely affected include one locus where significant resources have been documented, seven loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at nine loci.

Compared to the No Action Alternative, Alternative E includes three additional loci where potentially significant resources have been identified and could be adversely affected by installation of the Little River Trail and Wonderland Hotel parking areas, and installation of sewer and water lines. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis. The proper execution of avoidance or protective strategies could ensure that no effect on archeological resources would occur.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, the removal of 17 to 19 contributing buildings within the NRHP listed Elkmont Historic District would constitute an adverse effect. The potential effects to archeological resources under Alternative E could also result in a determination of adverse effect.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type (s) and cost of the mitigation cannot be calculated at this time.

4.7.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative E would result primarily from the greater development, intensity of use and increased activities within the District. Immediate impacts to natural resources would result from ground-disturbing activities associated with building removal and infrastructure modifications.

Additional long- term impacts would result from increases in visitation, pedestrian traffic and associated activities. These effects are discussed below for each natural resource.

4.7.2.1 Soils

E1 proposes removal of a total of 42 buildings within the District (40 if E2 is chosen). As a result, adverse effects on soils would occur during project implementation if the use of heavy machinery and other equipment is necessary for the removal of the buildings. Short- term, moderate, adverse effects to soils would occur as a result of installation of new water and sewer lines, underground utility lines, road repair and construction of pathways. All of these activities would require either excavation or grading, resulting in adverse effects to soils over a wider area in the District than in the No Action Alternative. Impacts occurring during construction would be mitigated by protocols established by the Park to minimize impacts to soils and the adverse effects on soils due to project implementation activities would be temporary.

Additional activities required under Alternative E that would directly adversely affect soils include construction of four parking areas (plus two additional parking areas if E2 is selected), installation of water, sewer and electrical lines, and force mains to service the Wonderland Hotel and Annex (if E2 is selected) and cabins, expansion of the wastewater treatment plant, road repairs and minor widening, installation of paths, and installation of a new bridge across the Little River (E2 only). All of these activities would cause additional ground disturbance and result in adverse effects to soils over a wider area in the District than the No Action Alternative. For some activities, such as sewer and water line installations, the adverse effects would be temporary. The new bridge construction across the Little River is of particular concern due to the presence of flowing water. Although Best Management Practices would be followed to minimize adverse effects, any construction within a stream channel would likely cause a temporary increase in erosion and sedimentation into the river. As vegetation is reestablished, the erosion rate would decline and adverse effects on soils would be diminished in those areas where infrastructure components are installed.

Impervious surfaces would be eliminated when the buildings are removed (1.44 acres in E1 and 0.97 acres in E2). Subsequently, additional area would be available for surface water infiltration and runoff quantities would decrease in those areas, providing long-term, moderate, beneficial effects to soils. Once vegetation is reestablished in areas formerly occupied by buildings, the plants would supply additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with their root systems. The beneficial effects provided by the vegetation would increase as the plants mature.

Although impervious surfaces would be removed in some areas under this alternative, in other areas, impervious surfaces would be added by the paving of roads and parking areas. In addition, since the number of visitors is expected to increase and the estimated increase in internal pedestrian trips is likely to be considerable (see Table 4- 7), additional incremental impacts would occur due to soil compaction and related impacts to plants from trampling.

An additional 1.5 acres (E1) and 3.0 acres (E2) are proposed to be covered with pavement. Pervious concrete would be used in parking areas and some infiltration is possible where

this material is used. Although the surface would produce higher rates of runoff than undisturbed, vegetated surfaces, these effects are expected to be moderate following implementation of E1, with a 5.6 percent increase over the existing condition. Runoff would increase by approximately 6.9 percent under E2. This increase in runoff could cause additional soil erosion and subsequent sedimentation of surface waters and result in indirect, long- term, moderate, adverse effects on soils. Sediment loading would result in degradation of water quality due to contamination of runoff with petrochemicals and other contaminants from automobiles.

4.7.2.2 Biotic Communities

4.7.2.2.1 Terrestrial Plant Communities

Implementing Alternative E would result in major impacts to plant communities within the study area, primarily as a result of effects to the G2 ranked, "globally imperiled" Southern Appalachian montane alluvial forest habitat. Retention of buildings throughout the District would require hazard tree removal, beyond that which is currently conducted adjacent to trails and within the Elkmont Campground. This necessary activity, in addition to the physical presence of individual buildings and the associated infrastructure, would severely disrupt plant community dynamics within the District.

Initial vegetation management would be aggressive adjacent to retained buildings. Subsequent annual maintenance of the perimeter around historic structures would continue to be intensive, permanently preventing old growth forest structure from developing. Because the grounds would be open to the public and buildings would be retained throughout the District in Alternative E, a significant amount of vegetation management would be required. At each remaining building, and at exhibits and trailheads, hazard tree removal and vegetation management would be needed.

These direct adverse impacts are expected to be long- term and major, and would occur over a larger area in this alternative than in previously discussed alternatives because more buildings are retained. Adverse effects would be incrementally greater if E2 is implemented due to retention of the Wonderland Hotel and Annex. Increased pedestrian and vehicular traffic would also create long- term, indirect negative major impacts on biotic communities.

In Millionaire's Row, Daisy Town and the Wonderland Club, the majority of the buildings are proposed to be retained, eliminating the potential for expansion of plant communities in those areas. The retention of buildings and the associated activities within the Little River floodplain in the area known as Millionaire's Row would result in a reduction in the opportunity for reestablishment of the globally imperiled montane alluvial forest.

Removal of the buildings in the area of the District known as Society Hill would allow a variety of plant community types to increase. In Society Hill, forested areas have experienced considerable disturbance due to past human activity. Plant communities present include early successional Appalachian hardwood forest, dominated by tulip tree and red maple, with smaller areas of Appalachian

montane oak- hickory, southern Appalachian cove, and Virginia pine successional forest communities. Removal of the buildings would allow for expansion of these communities and succession to hardwood forest.

Short- term, moderate, direct adverse effects to biotic communities are expected to occur during construction as well as indirect, long- term adverse impacts following project implementation. During construction, excavation would disturb vegetation and most likely require removal of smaller trees and root masses. The possible use of heavy equipment for removing buildings along with the vehicular and pedestrian traffic would likely cause temporary disturbance of plant communities. Under E2, the activities required for reconstructing the Wonderland Hotel and providing access to it and the Annex would require ground disturbance for installation of sewer, water and electrical lines, and paving of parking areas. Following construction, the expected increase in visitation, and the increase in pedestrian traffic would further increase the stress on plant communities and wildlife habitat.

Although wildlife habitat could be expanded through removal of buildings, under Alternative E, the area available would be relatively small and the habitat may not be suitable for a wide variety of species that cannot tolerate the presence of humans and their vehicles. Visitation is expected to increase as compared to the No Action Alternative and the higher visitation rate would be accompanied by a proportional increase in the improper storage and disposal of food items. Food brought into day use areas and garbage attracts wildlife, increasing the potential for human – wildlife encounters. Encounters with black bears, raccoons and even small rodents can be dangerous for both the human and the wildlife species involved. Increased traffic would also increase the potential for vehicular collisions with wildlife. These indirect, adverse effects on wildlife would be minor because they affect individuals and not entire populations.

4.7.2.2.2 Aquatic Communities

Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative E. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Installation of sewer, water, power, and phone lines will all result in temporary disturbance within and adjacent to the floodplain of the Little River. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and adverse, resulting from an increase in impermeable surfaces and associated runoff into surface waters. Increased visitation will result in trampling of vegetation and loss of soil stability. Increased traffic and parking will result in deposition of petrochemicals, which, when mixed with rainfall runoff, can result in contamination into adjacent aquatic systems.

4.7.2.3 Threatened, Endangered, Rare and Sensitive Species

Alternative E would have no direct effects on federal- listed threatened or endangered species, since none are known to occur within the proposed project implementation area. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*), also occur within the District. Because many of the buildings would be retained under Alternatives E, and visitation is expected to increase following project implementation, increases in suitable habitat for threatened, endangered, rare and sensitive species are expected to be negligible. Due to the increased visitation expected under Alternative E, the potential for trampling of herbaceous vegetation by pedestrians would also be elevated, indirectly resulting in long- term, minor adverse effects on these species. The chamomile grapefern is especially susceptible to the damage from trampling and the viability of its populations in the District is monitored by the Park for that reason.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*), is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be minor. Following project implementation, increased impervious surfaces and associated runoff could result in minor adverse effects to water quality and could affect aquatic species downstream, such as the hellbender.

Although it is not a federally or state- listed species, the synchronous firefly that has been observed in the District could benefit from expanded habitat as well; however, retention of most of the buildings, with the exception of those in Society Hill, would prevent a substantial increase in grassy habitat from occurring following project implementation. Increased visitation and use could potentially result in long- term, moderate, adverse effects on synchronous firefly populations in the District.

Overall, the long- term, indirect effects on threatened, endangered, rare and sensitive species are expected to be moderately adverse due to impacts on existing and potential habitat.

4.7.2.4 Wetlands

No direct impacts to wetlands would occur as a result of implementing Alternative E. However, wetlands may experience long- term, minor, indirect adverse effects created by retention and use of adjacent buildings, such as those found in Millionaire's Row. The environment surrounding residential buildings is subject to runoff from impervious surfaces, soil compaction, deposition of petrochemicals, planting of non- native species and vegetation management. These types of chronic disturbances tend to result in loss of native plant diversity and subsequent degradation of wildlife habitat.

Several wetland functions and values would be somewhat diminished, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, and fish/shellfish habitat.

The wetlands adjacent to Bearwallow Branch in Millionaire's Row would be most susceptible to these effects.

4.7.2.5 Water Quality

Water quality can be affected by a variety of activities resulting in discharge to surface waters both during and following project implementation. Alternative E would result in changes to surface water runoff rates and volumes and would require additional discharge of treated effluent into the Little River. Potential impacts to water quality resulting from implementation of these alternatives are described below.

Alternative E proposes a more intense use of the buildings across most of the District, with the exception of Society Hill. During the project implementation period, construction activities would have the same effects as described in previous alternatives in that many areas would experience ground disturbance due to the use of heavy equipment and the movement of construction vehicles to and from the areas containing the buildings. Although Best Management Practices would be followed, there would still be potential for sedimentation to occur during project implementation, resulting in short- term, minor adverse effects to water quality. Once the areas are planted and native vegetation has become established, some of these effects would be mitigated.

Retaining more buildings in this alternative would increase runoff because more impervious surfaces would remain. In addition, 1.5 and 3.0 acres would be paved for construction of parking areas under E1 and E2, respectively. A 5.6 percent increase in runoff over the No Action Alternative is expected to occur following implementation of E1. The increase in runoff associated with E2 is estimated at 6.9 percent. Therefore, the long- term, indirect effects on water quality due to increased runoff and potential increase in erosion would be adverse and minor.

Sewage Treatment and Pollutant Discharge

Alternative E includes rehabilitation of the Appalachian Club interior for public day use rental, which requires public restroom facilities, rehabilitation of some of the cabins in the Millionaire's Row area for visiting scientist temporary housing and some in the Wonderland Club for public lodging. In addition, if E2 is chosen, reconstruction of the Wonderland Hotel and Annex for lodging would be added as well. The additional wastewater treatment capacity for improvements necessary under E1 and E2 is estimated at 5,888 and 14,375 gallons per day, respectively. Although the additional daily flows for E1 would not stress the hydraulic capacity of the treatment plant, they would increase the erratic diurnal flow pattern with much of the daily flow entering the plant during peak flow times during each day. This would be resolved by the construction of a flow equalization basin at the head of the plant that would receive the daily flow and release it into the plant at a constant flow. This is the only improvement to the wastewater treatment plant necessary to support E1.

The additional daily flows for E2 would cause the total projected peak flow to exceed the current capacity of the wastewater treatment plant. Because treated wastewater is discharged into the Little River, which has been designated an Outstanding National Resource Water, the discharge must not add any additional pollutants to the river or degrade the current water quality. In addition, because the State of Tennessee's environmental regulations prohibit expansion of the hydraulic capacity of the existing

plant, the additional wastewater treatment would have to occur at an alternate location, either through addition of a drip irrigation system located in a suitable area outside of the District or by piping the wastewater to the nearest treatment plant in Gatlinburg.

If either of these methods outlined under E2 were utilized, a separate investigation of the potential resource impacts associated with construction these systems would be required prior to implementation. Water quality standards for Outstanding National Resource Waters are expected to continue to be met at the Elkmont wastewater treatment plant because concentrations of contaminants would remain below the water supply maximum contaminant level at that location (See Table 4- 12). Since water quality standards for Outstanding National Resource Waters would continue to be met, no long- term effects to water quality would result from increased wastewater discharge under E2.

There are not any baseline conditions established for thermal loading, other than typical wastewater temperatures of 60 degrees Fahrenheit (see Section 2.2.1); however, the incremental increase in effluent discharge if E1 or E2 was implemented would be such that temperature effects are expected to be negligible (McGill Associates 2004). The effluent discharge rate would remain the same as the existing condition under all alternatives. At the current rate of discharge, thermal impacts are dissipated entirely within three feet of the discharge pipe due to effluent mixing with cooler water in the pipe from the plant to the discharge point. Because the cooling would continue and the rate of discharge would remain the same under all alternatives, there would be no thermal impacts to the Little River as a result of implementing this alternative (McGill Associates 2004). Therefore, the wastewater generated by rehabilitation and reuse of the Appalachian Club, some of the cabins and (if E2 is chosen) the Wonderland Hotel and Annex would have no long- term effect on water quality through discharge of additional wastewater.

Wastewater components required under E1 include sewer lines, low- pressure sewer force mains, a sewage pump station and grinder pumps behind cabins used for public lodging and for visiting scientists. Installation of these sewage system components would require additional ground disturbance that would result in short- term erosion. However, many of the sewer pipes would be installed in areas along roadsides that have already been impacted and when vegetation has become reestablished in those areas, the potential for erosion and sedimentation from the ground disturbance would be eliminated. To cross streams, pipelines have been planned to be suspended under bridges rather than be placed under the streambed. Where lines cannot be hung from bridges, they would be bored under the streambed, avoiding the potential for disturbance to the stream substrate and potential impacts to water quality. Therefore, there would be no long- term, adverse effect on water quality due to the installation of pipes and other wastewater treatment components.

4.7.2.6 Floodplains

Direct, short- term, minor, adverse effects on the 100- year floodplain are expected to occur during construction as a result of implementing Alternative E. Most buildings in Millionaire's Row would be retained, including three that lie within the 100- year floodplain limits. Use of these three buildings ((Miller (#46), Faust (#47) and Faust garage (#47A)) that lie within the 100- year floodplain would be contrary to NPS policy

that expressly prohibits development within floodplains and would therefore require a formal Statement Of Findings if this alternative would be implemented. According to Director's Order #77- 2, the NPS must "avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks".

As part of the cabin rehabilitation process, utility services would be connected to the cabins. Although these services would be installed below ground and would not occupy floodplain storage following construction, the vegetation and soils would be extensively disturbed as the lines are installed. Soils adjacent to Bearwallow Branch are composed of Spivey soils. These soils have a high organic content and, as such, are very susceptible to damage from vehicular traffic. As a result, extensive restoration of the floodplain of Bearwallow Branch to stabilize the streambank and reestablish vegetation would be required if Alternative E was implemented. In addition, work to restore and rehabilitate buildings in Millionaire's Row would eliminate the possibility of additional regeneration of the montane alluvial forest as well.

One building will be removed (Young (#48)), resulting in permanent, but negligible benefits due to the removal of impervious surfaces. Additional indirect benefits would be provided because removal of buildings adjacent to the floodplain would eliminate future ground disturbance and soil compaction associated with residential use and would increase the area available for infiltration; however, this effect is expected to be negligible in terms of floodplain function.

Implementation of Alternative E would indirectly create a permanent, minor, adverse effect on floodplains by increasing the amount of impervious surfaces and the erosion potential throughout most areas of the District. The parking areas, roadway improvements, and soil disturbance required to implement the portions of Alternative E that would accommodate the expected increase in visitation, and the visitation itself, would be detrimental to most native plant communities that allow for soil stabilization and precipitation infiltration. This effect would be most evident in Millionaire's Row, which was constructed around the floodplain of Bearwallow Branch. If the cabins retained in this area are utilized for temporary housing, disturbance would occur both during and following project implementation in the form of heavy equipment, and vehicular and pedestrian access.

4.7.2.7 Air Quality

As in the No Action Alternative, there would be a temporary increase in emissions under Alternative E due to operation of construction equipment during project implementation. Direct, adverse effects to air quality during construction would be short- term and negligible. These effects could be minimized by reducing equipment idling times, ensuring that all construction equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September).

Visitation to the District is expected to rise following implementation of Alternative E. Air quality can be affected by the accompanying increases in vehicular traffic and by how this traffic moves throughout the District. Increased engine idling times will generally occur as traffic congestion causes increases in travel time along roadways, within parking

areas, at gates, and at destination points that are visible from the roadway, such as at wayside exhibits. As a result, projected increases in visitation would be accompanied by a lower level of service on roadways servicing the District and more emissions.

The results of an analysis was performed by the Park to evaluate the potential nitrogen deposition and nitrogen dioxide (NO2) impacts from the use of the proposed Appalachian Club and Wonderland Club parking lots show impacts very far below the nitrogen deposition threshold of 0.01 kilograms per hectare per year. In an independent air quality assessment performed by McGill Associates based on a busy Saturday in summer, the projected increase in traffic is expected to result in an annual 6.57- ton increase in NOx emissions and a 9.49- ton increase in VOCs emissions in 2015. Under Alternative E, the increase in emissions for both pollutants is greater than 5 tons per year over the existing condition, indirectly resulting in long- term, major, adverse effects on air quality in the District. A comparison of emissions for the alternatives is provided in Table 4- 8 at the end of this chapter.

4.7.3 Impacts on Interpretation and Visitor Use

4.7.3.1 Visitor Experience

Visitor experience is expected to change significantly as a result of implementing Alternative E. Adverse effects on visitor experience would occur during project implementation. These effects would be created by increased traffic, noise, dust and potential delays in circulation caused by movement of construction equipment. Although project implementation operations would adversely affect visitor experience, this effect is expected to be short- term and negligible.

The long- term indirect effects on visitor experience following project implementation would be both beneficial and adverse. Long- term, major beneficial effects would result from creation of additional visitor facilities and interpretive features. Public lodging would be provided in Alternative E. The Wonderland Club cabins are proposed for public lodging in both options of Alternative E. Under E2, the Wonderland Hotel would be reconstructed and the Annex restored and rehabilitated for use as public lodging and food service. The public lodging and an educational program option would be operated by a private concessioner. The program would provide opportunities to guests staying in the Wonderland Hotel, Annex and cabins to experience recreation and education- based programs within the District and the Park. These programs may include such items as guided back- country expeditions, and cultural resource education- based opportunities. Temporary housing for visiting scientists would be provided at cabins in Millionaire's Row.

Sixteen cabins would be restored in Daisy Town, allowing visitors to experience most of this section of the District in its historical context. The Chapman (#38) cabin would be restored in Society Hill, allowing visitors to learn about Colonel Chapman's role in the establishment of the Park. While the majority of the Society Hill buildings would be removed, restoration of native vegetation would be performed in these areas following construction. Visitors would also have a limited opportunity to view natural communities.

Providing additional historical information in the Elkmont Nature Trail brochure, installation of exhibits inside the Appalachian Clubhouse and Spence (#42) cabin, the orientation kiosk and up to 10 wayside exhibits would create a long- term, major, beneficial effect on visitors' experience in the District.

However, visitor experience would also be indirectly adversely impacted under Alternative E, primarily due to the effects of a considerable increase in visitation. The exhibits, improved infrastructure, lodging and educational opportunities offered under both options of Alternative E would create user demand conflicts, such as those associated with traffic congestion and traffic safety hazards, increased deterioration of cultural and natural resources due to pedestrian and vehicular traffic, diminished air quality, and a change in noise throughout the District. Although noise levels are not expected to reach the level of adverse impact under any alternative, the anticipated trips to, from, and within the District would be accompanied by the sounds of vehicles and a higher number of visitors. The increased visitation projected under Alternative E would also result in a long- term, major adverse effect on the visitor experience within the Elkmont Campground for the same reasons.

4.7.3.2 Visitor Facilities

Visitor facilities would experience long- term, major, direct and indirect benefits as a result of implementing Alternative E. Most of the historic buildings throughout the District, with the exception of the Society Hill buildings would be retained for a variety of use. A total of 10 wayside exhibits and an orientation kiosk with exhibits would be installed under this alternative. These exhibits would provide visitors with information on the natural environment and interpret the cultural resources and the cultural landscape, while providing a historic perspective on prominent figures in Elkmont and the Park's history. With the addition of the exhibits, visitors would gain additional opportunities to understand the history behind establishment of the Town of Elkmont, the history of the Appalachian and Wonderland Clubs and train stations, the establishment of the Park and how it affected Elkmont, and the Park's natural environment. Exhibits describing the natural and cultural history of the area would be placed strategically to orient visitors as they enter the District and most of the major sections of the District, including the campground.

Like previous alternatives, additional benefits would be provided by the construction or repaving of four (E1) or six (E2) parking areas in the District, minor repaving of several roads, construction of walking paths and restoration of the Appalachian Clubhouse, including restroom facilities and interior exhibits, for day use. Some of the areas in which visitors currently park are not paved and are eroded and rutted. Creation of pervious pavement lots would provide a stable surface for parking while preserving the aesthetic quality of the environment expected by the visiting public in a National Park.

The Wonderland Hotel lodging operations would be operated by a concessioner if E2 was implemented. In addition to lodging, Hotel guests would have the option of dining at the Hotel and this service would be extended to all persons staying overnight in the cabins as well. As previously discussed, the concessioner would also provide educational opportunities which would be made available to the hotel and cabin guests as part of their lodging fee. While these proposed opportunities at the Wonderland Hotel would provide a direct benefit to visitor facilities, the NPS is required to first examine whether

this is a necessary and appropriate use for facilities within a National Park (see discussion provided in Section 4.7.8). In addition, the decision regarding whether or not to reconstruct the hotel must follow Department of Interior guidelines. Both management policies reiterate that reconstruction can only occur upon specific written approval by the Director after a policy review at the Washington office level. If reconstruction is chosen, it would have to be undertaken in accordance with *The Secretary's Treatment Standards*, and the building would retain its status as contributing to the District even though it would not retain the historic integrity of its fabric nor its authenticity (NPS 2000).

4.7.4 Impacts on Socioeconomic Environment

Alternative E would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.7.4.1 Population and Environment

No direct or indirect effects on population and environment would result from implementation of Alternative E. As discussed in Section 3.4, the top local industry category includes businesses that have close ties to tourism. Recreation, accommodation and food service industries supply important service to visitors to the Park. Sevier County is one of the most popular vacation locations for people traveling within the United States. In 2003, the number of guest rooms available in Sevier County was 25,289 with hotel and motel rooms comprising 68 percent of the total. The market has indicated steady growth in cabin and condominium rentals as well (Lodging Resources, Inc. 2004).

Gatlinburg, as a gateway community, is the destination for lodging chosen by many visitors to the Park and visitation to Gatlinburg mirrors the trend of visitation to the Park. Elkmont is located in Sevier County, Tennessee. Sevier County has an estimated population of 73,703, which represents an approximate increase of 39 percent from 1990 to 2000. This increase in population is also reflected in the increased visitation to the Park and the District as well. During the past 30 years, the average number of annual visits attributed to the District has been approximately 350,000. In 2001, annual visitation to the District was approximately 375,000. Projections for visitation to the District range from a low of 409,852 in 2006 to a high of 459,023 in 2015 based on the current condition, irrespective of the alternative selected for the District (Table 3- 19). Considering the increase in visitation to the area, it is logical to conclude that additional lodging and food service accommodations would be required in the area in future years. As a result, there would be no effect on existing local populations as a result of implementing an alternative that includes pubic lodging, as is proposed in Alternative E.

4.7.4.2 Land Use

Implementation of Alternative E would directly result in long- term, moderate adverse effects to land use. These effects would occur through opening the grounds to the public following removal of some buildings and structures, retention of a large number of buildings for public lodging and by providing a variety of additional opportunities for those uses described in the land use zone designations in the 1982 General Management Plan that would result in an increase in the visitation to the District and the internal trips within the District (see Tables 4- 6 and 4- 7). Implementation of Alternative E would continue to allow for use of public roadway corridors, accommodations at the existing Park quarters, and picnicking and camping at the Elkmont Campground. Historical and

natural resource interpretation would be increased over that which is currently offered through installation of a variety of exhibits, retention of some buildings for interpretive uses and the Appalachian Clubhouse as a public day use facility and self- guiding museum. Public lodging would be provided in cabins in some portions of the District and, if E2 is implemented, also at the Wonderland Hotel and Annex. Visiting scientist housing would also be provided in Millionaire's Row under both E1 and E2.

These uses would be supported by alterations and additions to existing infrastructure including new parking areas, restroom facilities, electric and water connections, and an upgrade to the wastewater treatment plant. Increased visitor opportunities within the District are expected to result in land use conflicts including degradation of air quality, visual and aesthetic impacts, traffic congestion and crowding.

4.7.4.3 Access and Circulation

Alternative E would create direct, long- term, major, adverse effects on traffic and circulation within the District. Alternative E proposes public lodging at cabins in one area of the District, temporary housing for visiting scientists in another area, exterior restoration of cabins for use as interpretative exhibits and overnight accommodations and dining facilities for the general public at the Wonderland Hotel (if E2 is chosen). Due to the high level of redevelopment, this alternative has the second greatest potential for traffic problems. Compared to the No Action Alternative, the estimated change in volume of trips along Elkmont Historic District roads is 1,050 (1,467 if E2 is implemented). A comparison of estimated change in volume of trips between alternatives is provided in the summary tables at the end of this chapter.
To alleviate potential conflicts between vehicles and pedestrians, a number of roadway modifications are included. However, even with the proposed modifications, the level of service in some areas would be reduced (from A to B if E1 is selected and from A to C if E2 is selected), resulting in a decrease in average travel speed, increased percentage of time spent following and reduced headway between vehicles. The Level of Service describes operational conditions within a traffic stream, with Level A representing free flow traffic, up to Level F in which traffic delays can be severe. A change from Level A to Level B would result in a decrease in average travel speed, increased percentage of time spent following and reduced headway between vehicles.

4.7.5 Impacts on Other Resources

4.7.5.1 Viewshed

Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the condition of the buildings.

The established baseline for this environmental analysis and the associated visual analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for the visual analysis. The buildings within the study area are considered obstructions to the natural viewshed that would be

removed if the General Management Plan (the No Action Alternative) was implemented. As a result, long- term, indirect, major, adverse effects would be created by retention of buildings in most areas of the District (including the reconstructed Wonderland Hotel and restored / rehabilitated Annex under E2). Although retention of these buildings would adversely affect visual quality by obstructing the natural viewshed, some long-term, negligible benefits to visual quality and aesthetics would be realized through removal of the most of the buildings in Society Hill, increasing the area available for restoration of native plant communities (photos 3 through 6A in Appendix D depict the existing views of a variety of historic buildings and simulations of the potential views following removal of these buildings). Installation of new infrastructure components required to implement these alternatives (parking areas, paths, electrical, sewer and water supply components) would further impact the natural viewshed. Direct, adverse impacts to the District viewshed are expected to occur during implementation of Alternative E because of the presence of machinery and ground disturbance but these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The direct effect on the composite viewshed would also be long- term, major, and adverse under Alternative E due to retention of most buildings, structures, and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix D) would also be adversely impacted by building retention with regard to the area that is visible from the transportation corridors.

4.7.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during project implementation due to construction activities. The high noise levels of combustion- powered equipment, particularly due to earth moving equipment (usually diesel), are expected to be the main contributor to the sound levels during construction and can interfere with the ability of individuals near the work site and passersby to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The major construction elements of this project may include removal of buildings, hauling, grading, and paving, as well as restoration and rehabilitation of buildings and construction of new facilities. Overall, construction noise is relatively short in duration and would be restricted to daytime hours at the time of year in which visitation is expected to be the lowest.

Future noise levels under Alternative E are expected to be in the 50 to 60 dBA range, with maximum levels (over short periods of time) exceeding 70 dBA for loud vehicles. As in the No Action Alternative, since these noise levels do not exceed the noise abatement criteria of 67dBA, Alternative E would have no long- term effect on noise in the District.

4.7.6 Impacts on NPS Operations

As is the case with all alternatives, the buildings and associated grounds would remain closed while project implementation is occurring. In addition to removal of buildings, E1 includes modifications to existing infrastructure, restoration of cabins for interpretive exhibits and restoration and rehabilitation of the Appalachian Clubhouse as a public day use rental facility. Reconstruction of the Wonderland Hotel in conjunction with

restoration and rehabilitation of the Annex is also proposed in E2. In addition, temporary housing for visiting scientists would be provided at six cabins in Millionaire's Row, while public lodging would be provided at cabins in the Wonderland Club. All of the new visitor facilities, exhibits and infrastructure would have to be maintained by NPS staff, adding to current operation and maintenance costs.

Alternative E would create direct, major, adverse effects on NPS operations. The need for funds or staff to protect the buildings from vandalism or further deterioration would be increased in this alternative respective to all others previously discussed. Although maintenance of the cabins, Wonderland Hotel and Annex would be the responsibility of the concessioner, funds and staff would be required to maintain the buildings retained in Daisy Town, the Chapman and Spence cabins, the visiting scientist housing, the interpretive exhibits, and the day use facilities at the Appalachian Clubhouse, as well as the general infrastructure (roadways, parking lots, walkways, water supply and wastewater systems). Maintenance activities would include such items as mowing, road repairs, daily cleaning and supply of public restrooms, repair of structural damage to buildings not operated by the concessioner, and general maintenance of utilities and infrastructure. Some of the costs associated with long- term maintenance and other requirements of Alternative E could be offset by revenues gained from rental of the Appalachian Clubhouse as a day use facility.

The concessions services included in Alternative E would have a direct, adverse impact on the NPS concessions management program as a result of the substantial increase in the workload for this program. The increased workload would begin with project planning and would continue through the opening and operation of the new facilities. Concessions management would be heavily involved in planning for new facilities and services, selection of a concessioner, completion of capital improvements required, transition to a new concession contract, and overseeing actual operation by the concessioner. It is anticipated that funding would be required for a full- time GS- 9 or GS- 11 Concessions Management Specialist/Assistant to supplement the current staffing in this program of one Concessions Management Specialist. Funding for an additional vehicle, office space, and office equipment for this position would also be required.

The need for law enforcement would also increase substantially as a result of increased visitation, potential traffic and circulation problems, increased encounters with wildlife, and other emergencies that may arise. Law enforcement needs are expected to change significantly to the extent that housing and funding for a full- time ranger (level GS- 9) would be required to police the exhibits and buildings retained.

In moist cove forest communities, such as those found in the District, research has shown that between one and one and one- half percent of canopy trees fail on an annual basis (Runkle 1982). Therefore, hazard trees adjacent to exhibits, trails, roadways and buildings would be removed to reduce the possibility that visitors could be harmed by falling trees. The indirect effect on NPS operations due to hazard tree and other vegetation management is expected to be long- term and moderately adverse because most areas of the District and the grounds would be open to the public.

4.7.7 Cumulative Effects

With the exception of Society Hill, where all but one building would be removed, most contributing buildings would be retained under this alternative. The removal of 17 to 19 contributing buildings in Alternatives E would cumulatively add to the loss of historic buildings from this period of significance in the Park. Other resort properties representing this time period, such as hotels and lodges inside the Park and hotel and cabin communities outside the Park, have been removed or may no longer retain historic integrity. When added to past actions, implementation of this alternative would cumulatively result in a loss of groupings of buildings representing this period in southern Appalachian history.

Retaining buildings throughout the District, in conjunction with the level and type of use proposed under Alternative E would leave little opportunity for expansion of existing plant communities, including the globally imperiled montane alluvial forest. This plant community type is considered imperiled because only six to twenty examples of this community type are known to exist globally. In the Southern Appalachian Mountains, alluvial floodplain forests have experienced severe impacts and losses as a result of intensive land use and development in the relatively flat and highly productive valley bottoms. Outside of the National Park, there are no assurances these areas will remain in forest. This would result in a long- term, major, cumulative adverse effect as an opportunity to reestablish this rare plant community would be eliminated. If Alternative E was implemented, beneficial cumulative effects to natural resources would generally be created by removal of buildings and subsequent revegetation throughout a portion of the District, but these beneficial effects would be less than all previously discussed alternatives and would not include the montane alluvial forest.

The impacts of implementing Alternative E on floodplains and wetlands would be primarily limited to the District and the Little River watershed. This alternative would create long- term, minor adverse cumulative effects on wetlands and the 100- year floodplain by proposing activities in the District that would not be compatible with reestablishment of plant communities that could provide soil stabilization and reduction in erosion and sedimentation. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals from parking area runoff can add to the existing load already entering the river system from the high number of visitors to the Park and surrounding gateway communities. Only six water bodies in the State of Tennessee are designated as Outstanding National Resource Waters. Four of these waters are located within the Park. All development within ONRW watersheds are strictly regulated to prevent degradation of these waters. The increase in runoff anticipated under Alternative E would contribute to the cumulative effect of contaminants entering the river from surrounding communities and from other land uses within the Park.

The increased visitation and internal traffic within the District to view exhibits would create a long- term, major, adverse effect on air quality. The effect of increases in NOx and VOC emissions resulting from implementation of Alternative E is very small when compared to overall emissions in the Park and in the region. However, because the entire Park is designated a non- attainment area and a Class I area under the Clean Air Act (the highest level of air quality protection) even a small increase adds to already degraded air quality and constitutes a long- term adverse cumulative effect.

Invasive, non- native plant species thrive in disturbance areas. The spread of invasive, non- native species could be further exacerbated by increased disturbance caused by pedestrian traffic into sensitive areas. Permanent revegetation with native species would create a beneficial cumulative effect by reducing the area available for invasive, non- non native species to become established, thereby decreasing the potential for these species to infiltrate into surrounding areas of the Park. Failing to continue an invasive, non-native species management program at Elkmont Historic District could, over time, result in the spread of those species into other areas of the Park adding exponentially to the existing adverse effects that invasive, non- native species have on the Park's botanical diversity. In addition, cumulative adverse effects to NPS operations would also occur as a result of implementing Alternative E, primarily due to the costs of project implementation and operations within the District following project completion.

Even with a projected shortfall in funding of approximately $1.1 million in 2004, every law enforcement position continues to be filled immediately so that the safety and emergency response expected by visitors is not compromised. If Alternative E is implemented, funding of the entire project implementation ($13.5 million for E1; $21.8 million for E2) would have to be provided from another source. Additional funds would have to be reallocated from other programs in the Park to meet maintenance and law enforcement needs. Both of these economic needs would result in long- term, major, adverse cumulative impacts on Park operations.

4.7.8 Conclusion

Implementation of Alternative E would create major impacts to native plant communities where buildings are retained, resulting in a loss of potential for the long-term recovery of these resources. Disturbances to the forested ecosystem due to the retention of buildings and associated activities under this alternative would eliminate critical biological components, necessary for characteristic forest stand development through time. The specific species composition and temporal component required for the globally imperiled montane alluvial forest to become reestablished at this site would be eliminated if this alternative was implemented.

Additional development would result in increased surface water runoff and associated degradation of the water quality of the Little River, an Outstanding National Resource Water. Other resources whose productivity would be adversely affected or limited as a result of implementing Alternative E include soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, water quality and air quality. Under Alternative E, the overall long-term productivity of biotic resources would be adversely affected due to the retention of buildings, paving, installation of infrastructure, and increased visitation expected throughout the District.

Direct, long- term, major beneficial effects would be created by the retention of the Appalachian Clubhouse, the 16 Daisy Town cabins, the Chapman cabin (#38), the cabins in the Millionaire's Row and Wonderland Club areas, and the retention of most of the District's cultural landscape characteristics and features. Reconstruction of the Wonderland Hotel under E2 would provide direct benefits to cultural resources and to visitor use facilities. Retention of these features would also provide more opportunities for cultural resource interpretation. The expanded interpretive opportunities, providing

access to trails and exhibits, and correction of erosion problems at culverts are all beneficial effects. Other areas that would benefit from Alternatives E are visitor facilities and visitor experience. In addition, revenues achieved through rental of the Appalachian Clubhouse as a public day use rental facility could be used to offset the long- term maintenance and management costs associated with these alternatives.

Irretrievable commitments of resources would result if Alternative E was implemented as a result of removing 17 to 19 contributing buildings. Cultural landscape characteristics and features (mainly "spatial organization" and "buildings and structures"; see Table 3-3) would be impacted due to removal of the buildings in the Society Hill area. Indirect, long- term, moderate, adverse effects on the District and cultural landscape would include wear and tear on cultural resources retained due to increased internal trips to view exhibits and increased visitation. There would also be an irreversible commitment of resources due to elimination of up to 22 acres of potential montane alluvial forest habitat where buildings are retained.

Some unavoidable adverse impacts associated with implementing Alternative E would occur on many of the natural resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for species of concern and water quality. These effects are due to retention of buildings in the floodplain, increased area of impervious surfaces, increased visitation and subsequent pedestrian traffic along with greater potential for soil compaction and damage to vegetation from trampling, loss of potential for reestablishment of montane alluvial forest and increased potential for human encounters with wildlife. Two buildings would be retained for overnight use within the 100- year floodplain under this alternative. A garage that lies within the floodplain would also be retained. These actions would be contrary to NPS policy that expressly prohibits development within floodplains and would therefore require a formal Statement of Findings if this alternative would be implemented.

Greater visitation under Alternative E would result in degradation of air quality, additional wildlife habitat disturbance and wildlife / human encounters, more ground disturbance to install infrastructure components, creation of more parking spaces to accommodate increased traffic and additional costs to NPS operations for staffing and maintenance of the buildings and infrastructure, maintenance of the visiting scientist housing, management and implementation of the concessions contract, increased vegetation management, and additional law enforcement to deal with the impacts of increased visitation. Adverse effects on land use would occur due to crowding and traffic congestion caused by the increase in visitation to exhibits, cabins and (under E2) the Wonderland Hotel and Annex. Compared with all previous alternatives discussed, Alternative E also would provide less opportunity for benefits to native plant communities as restoration and revegetation are proposed throughout less of the District.

The proposed concession operation under E1 would allow the concessioner to rent 7 cabins and to provide the eco- tourism options to visitors as described earlier in this section. Under E2, the concessioner would have the ability to rent the cabins, as well as the reconstructed Wonderland Hotel and the Annex, and the opportunity to provide food service to all of the lodging guests would be included. The estimated total cost in 2007 dollars of implementing E1 and E2 are approximately $13.5 million and $21.8 million,

respectively (see Appendix C). These costs include the initial investment to modify the existing infrastructure to accommodate more visitors, which is approximately $2.4 million in E1, and $3.3 million in E2. The infrastructure costs in Alternative E1 are associated with connecting cabins to the water supply and wastewater systems. The additional funds for installation of the infrastructure in E2 represent the costs of providing water, wastewater, and parking for the Wonderland Hotel. An additional $6.1 million would be required to reconstruct the Hotel, restore and rehabilitate the Annex, and to install all the infrastructure components required to support the proposed use for these buildings under E2.

As part of this planning process, the economic feasibility of operating a concessions operation under E2 was examined (Lodging Resources 2004). The study indicated that the concessioner would not be able to make an initial investment in any of the capital improvements other than furniture, fixtures and equipment (FFE) necessary to run their operation and still have a reasonable opportunity to make a profit under E2. Although the study did not analyze the feasibility of E1, the income and profit levels in E1 would be expected to be significantly lower since the Hotel and Annex would not be a part of the concession operation. While it is not likely that a concessions operation could operate at a profit under E1 given that there are only seven cabins to rent to visitors and no food service, a thorough economic analysis of this alternative would have to be completed if it is selected for implementation. The Lodging Resources study should be viewed as a preliminary review only and conclusions regarding financial feasibility as only tentative. If either E1 or E2 are selected, a more thorough analysis of the selected alternative would be required to verify the feasibility of these alternatives and to develop a concessions contract.

Per the terms of the National Parks Omnibus Management Act of 1998 (16 USC Sec. 1a 5), and NPS *Management Policies* (2000), the NPS is responsible for determining whether or not concessions operations are necessary and appropriate "for public use and enjoyment of the National Park System in which they are located". A variety of legal policy requirements must be referenced in this analysis. Some of the considerations of these requirements include:

- the potential for adverse effects to Park resources that may be caused by a concessions operation;
- the suitability of the location proposed for commercial services and its proximity to existing services;
- the necessity of the concessions for the public to use and enjoy resources within the Park;
- the consistency of the concessions plan with conservation and preservation of natural resources;
- the ability to incorporate sustainable principles and practices in planning, sighting, construction, utility systems, selection, and recycling of building materials, and waste management;
- the ability of the concessions operation to enhance visitor use and enjoyment without causing unacceptable impacts to resources; and
- development of facilities and services restricted only to those necessary to achieve the Park's purposes.

Overnight use for the purpose of historic preservation at Elkmont was considered appropriate; however, based on the considerations listed above and other considerations found within 16 USC Sec. 1a 5 and NPS *Management Policies* (2000), the NPS has determined that the concession operations proposed in Alternative E are not necessary and appropriate and therefore, should not be implemented within the Elkmont Historic District.

4.8 Impacts of Alternative F

Alternative F entails the retention of all of the historic buildings in the District, with the exception of six cabins and a garage that are too structurally deficient to retain. Four other cabins and a rear room constructed in the 1970s or later are considered noncontributing and would be removed. Removal would be carried out by mechanical means or by hand. Buildings to be retained under Alternatives F include 16 cabins and the Appalachian Clubhouse in Daisy Town; 23 cabins and associated buildings in Society Hill; six cabins in Millionaire's Row; eight cabins in the Wonderland Club. F2 also proposes reconstruction of the Wonderland Hotel and restoration and rehabilitation of the Annex.

Day- use visitation as a result of implementing Alternative F is expected to increase by an average of 36 visitors per day, plus an estimated maximum of 226 or 278 guests (depending on whether F1 or F2 is implemented) utilizing overnight lodging. The length of an average daily visit is also expected to increase due to the various opportunities provided by day use of the Appalachian Clubhouse, the walking tour through Daisy Town, the various exhibits throughout the District, and public lodging in the Millionaire's Row, Society Hill and Wonderland cabins. Public lodging would also be provided in the reconstructed Wonderland Hotel and rehabilitated Annex under F2. Existing recreational use would continue to occur. New exhibits are proposed under this alternative and the Elkmont Nature Trail brochure would be updated to include natural and cultural information on Elkmont. The Park would continue to implement its existing natural resource management activities.

Some changes to parking and circulation within the District would be required. Once this work was completed, a concessioner would be responsible for most of the operation and maintenance costs in the District, but a moderate increase in NPS operation and maintenance expenditures would be required beyond what the Park already budgets for the roads, parking, water and wastewater systems, and operations and staffing.

4.8.1 Impacts on Cultural Resources

<u>Buildings and Cultural Landscape</u>

Implementation of Alternative F would result in direct, permanent, minor, adverse effects to the aboveground cultural resources of the Elkmont Historic District. Under F1, three contributing buildings would be removed. Under F2, one contributing building would be removed and the Wonderland Hotel would be reconstructed with a rehabilitated Annex. The majority of Elkmont's cultural landscape features and the overall District setting would be retained under this alternative.

Of the three contributing buildings proposed for removal under F2, two (Wonderland Hotel and Knaffl cabin (#36)) have significant portions that have collapsed. In addition, despite stabilization efforts, the Hotel Annex remains in Fair to Poor condition.

The cultural landscape characteristics and features of Elkmont, such as the historic swimming hole at Little River, stone walls and a footbridge over Bearwallow Branch, would be retained under this alternative as would eligible cultural landscape features. The preservation of the retained cabins, the rehabilitation of the clubhouse, and if F2 is

implemented, the reconstruction of the Wonderland Hotel, would be conducted in accordance with *The Secretary of the Interior's Treatment Standards*.

New visual elements would be introduced into the District, including an orientation kiosk with exhibits, ten wayside exhibits, six parking areas (seven if F2 is chosen), paths and roads, a replacement bridge, a well house, the pumping station access hatches and electrical control panel, a booster pump station and the stream bank stabilization work at the culverts where erosion has occurred.

Under Alternative F, there would be minor, adverse effects on the cultural landscape caused by the removal of one to three contributing buildings and to a limited degree, the addition of modern landscape elements such as parking areas and paths.

Indirect, long- term, moderate, adverse effects on the District and its landscape would result from the significant increase in visitation and would include traffic congestion, along with wear and tear from increased pedestrian traffic at the Appalachian Clubhouse; the Wonderland Hotel and Annex (if F2 is implemented); the Society Hill, Millionaire's Row and Wonderland Club cabins; and potentially at the porches of the retained Daisy Town buildings and the Chapman cabin (#38).

Long- term, beneficial effects would include retention of most of the buildings in the District; reconstruction of the Wonderland Hotel (as a contemporary re- creation of the original building) and restoration/rehabilitation of the Annex (if F2 is chosen); and retention of most of the District's cultural landscape characteristics and features. Restoration, rehabilitation, preservation, and reconstruction of the retained buildings in accordance with *The Secretary's Treatment Standards* would provide a direct, long- term, minor to major beneficial effect, as would the restoration of one noncontributing building (Swan (#4)) to a point within the period of significance based on available documentation.

The wayside exhibits, parking areas, new paths and roads, replacement bridge (F2 only), and the stream bank stabilization at eroded culverts would create minor, but acceptable adverse effects on cultural resources. The proposed new elements would constitute a minimal visual change District- wide. In addition, the proposed parking areas, paths, roads, and bridge would be located in areas already visually impacted by existing roads, paths, parking areas, and a noncontributing bridge.

The proposed utility lines would be buried in the ground, thereby removing intrusive power poles that postdate the period of significance. The belowground pumping stations would not be visible, except for small access hatches placed flush with the ground. The pumping station behind the Wonderland Hotel would have an aboveground electrical control panel roughly two to three feet tall surrounded by a security fence. These minor elements would be designed to be as unobtrusive as possible. The proposed well house would be small in size and located away from the District buildings in an area where it could be screened.

The long- term, indirect effects on the District and its landscape caused by the increase in visitation and traffic congestion, as well as wear and tear on buildings and landscape features, could reach the level of adverse effect, due to the numbers of visitors and

vehicles projected and the more intensive use proposed for many of the buildings and features slated for retention.

Archeological Resources

As with all alternatives, the potential for Alternatives F to impact archeological resources depends on the level, extent and location of ground- disturbing activities. Compared to all other alternatives, these alternatives propose retention of the greatest number of buildings for reuse either as lodging, day use or for interpretive exhibits. Consequently, additional water, sewer and electrical lines, parking lots, and paving activities would be necessary. The excavation and other ground disturbance required to install these features could adversely affect archeological resources. These impacts would be permanent, direct, adverse, and could be major. In addition, there is the potential for increased visitation and pedestrian traffic to result in site erosion following trampling of the plant cover. Additional site erosion could result in disturbance to shallowly–buried archeological deposits. These impacts would be indirect, permanent and could potentially be minor to moderate. The areas where archeological resources could potentially be adversely affected include one locus where significant resources have been documented, seven loci where potentially significant resources have been identified, and two areas that have not yet been surveyed. There would be no effect on potentially significant resources at nine loci (see Table 4- 2).

Compared to the No Action Alternative, Alternatives F include three additional loci where potentially significant resources have been identified and could be adversely affected by installation of the Little River Trail and Wonderland Hotel parking areas and installation of sewer and water lines. The ultimate impacts to archeological resources due to project implementation would depend on the outcome of additional investigations. NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case- by- case basis. The proper execution of avoidance or protective strategies could ensure that no effect on archeological resources would occur.

Section 106 Determinations

Under Section 106 of the National Historic Preservation Act, the removal of one to three contributing buildings within the NRHP- listed Elkmont Historic District would constitute an adverse effect.

The potential effects to archeological resources under Alternative F could also result in a determination of adverse effect.

All mitigation will be determined through formal consultation with the Tennessee State Historic Preservation Office, the Advisory Council on Historic Preservation and the Chickasaw Nation and Eastern Band of the Cherokee Indians Tribal Historic Preservation Officers. The exact type (s) and cost of the mitigation cannot be calculated at this time.

4.8.2 Impacts on Natural Resources

Impacts to natural resources due to implementation of Alternative F would result primarily from ground- disturbing activities associated with building removal and infrastructure modifications. Additional long- term impacts would result from increases

in visitation and pedestrian traffic. These effects are discussed below for each natural resource.

4.8.2.1 Soils

Implementation of Alternative F would create a direct adverse effect on soils. This effect is the same as described for Alternative E, but is further exacerbated by retention of additional buildings, a greater increase in visitation and pedestrian traffic, installation of more sewer and water lines, and additional modifications to infrastructure to accommodate the needs of the alternative.

Alternative F proposes removal of 14 buildings total in Elkmont Historic District (12 if F2 is chosen). As a result, short- term, adverse effects on soils would occur during project implementation if the use of heavy machinery and other equipment is necessary for removal of the buildings. Short- term, moderate, adverse effects to soils would occur as a result of installation of new water and sewer lines, underground utility lines, asphalt paths, and road repair and construction. All of these activities would require either excavation or grading, resulting in adverse effects to soils over a wider area in the District than in the No Action Alternative. Impacts occurring during construction would be mitigated by protocols established by the Park to minimize impacts to soils and the adverse effects on soils due to project implementation activities would be temporary.

In the long term, since the number of visitors is expected to increase by approximately 7 percent and the increase in internal pedestrian trips is estimated from 54 to 100 percent (depending on whether F1 or F2 is implemented), the soil compaction and related indirect, adverse impacts to plants due to trampling would likely be moderate to major.

Additional activities required under Alternative F include construction of six parking lots (plus one additional lot and expansion of another) to provide additional spaces (if F2 is selected), a gravel parking area, installation of water and sewer lines, (plus gravity sewer service lines for the Wonderland Hotel and Annex if F2 is selected), low pressure sewer force main, expansion of the wastewater treatment plant, road repairs and minor widening, installation of paths, and a new bridge across the Little River. All of these activities would cause additional ground disturbance and result in adverse effects on soils over a wider area in the District than in the No Action Alternative. For some activities, such as sewer and water line installations, the adverse effects would be temporary. The new bridge construction across the Little River is of particular concern due to the presence of flowing water. Although Best Management Practices would be followed to minimize adverse effects, any construction within a stream channel would likely cause a temporary increase in erosion and sedimentation into the river. As vegetation is reestablished, the erosion rate would decline and adverse effects on soils would be diminished in those areas where pipes and bridges are installed.

Some impervious surfaces would be eliminated when the buildings are removed (0.79 acres in F1 and 0.32 acres in F2). Subsequently, additional area would be available for surface water infiltration and runoff quantities would decrease in those areas, providing long- term, minor, beneficial effects to soils. Once vegetation is reestablished in areas formerly occupied by buildings, the plants would supply additional protection from erosion by preventing rain from falling directly on bare soils and by stabilizing soils with

their root systems. The beneficial effects provided by the vegetation would increase as the plants mature.

Although impervious surfaces would be removed in some areas under this alternative, in other areas, impervious surfaces would be added by the paving of roads and parking areas. In addition, since the number of visitors is expected to increase and the estimated increase in internal pedestrian trips is likely to be considerable (see Table 4- 7), additional incremental impacts would occur due to soil compaction and related impacts to plants from trampling.

An additional 2.4 acres (F1) and 3.5 acres (F2) are proposed to be covered with pavement. Pervious concrete would be used in parking areas and some infiltration is possible where this material is used. However, the surface would produce higher rates of runoff than undisturbed, vegetated surfaces, producing long- term, moderate adverse effects. Implementation of F1 would result in a 5.6 percent increase over the No Action Alternative. Runoff would increase by approximately 6.9 percent under F2, primarily due to construction of the new parking area adjacent to the Little River that would provide overflow parking for visitors to the Wonderland Hotel. This increase in runoff could cause additional soil erosion and subsequent sedimentation of surface waters and result in indirect, long- term, moderate adverse effects on soils.

4.8.2.2 Biotic Communities

4.8.2.2.1 Terrestrial Plant Communities

Most of the historic buildings are proposed to be retained under Alternative F. As a result, there would be essentially no opportunity for expanding existing plant communities or reestablishing the globally imperiled montane alluvial forest. Major, adverse effects to terrestrial plant communities are expected because chronic disturbance of vegetation would continue throughout the District due to the retention and proposed use of most buildings, pedestrian traffic and hazard tree management. The necessary hazard tree removal, in addition to the physical presence of individual buildings and associated infrastructure, would severely disrupt plant community dynamics within the District.

Initial vegetation management would be aggressive adjacent to retained buildings. Subsequent annual maintenance of the perimeter around historic structures would continue to be intensive, permanently preventing old growth forest structure from developing. Because the grounds would be open to the public and buildings would be retained throughout the District, a significant amount of vegetation management would be required. At each remaining building, and at exhibits and trailheads, hazard tree removal and vegetation management would be needed.

These direct adverse impacts are expected to be long- term and major, and would occur over a larger area in this alternative than in previously discussed alternatives because almost all buildings would be retained. Effects would be incrementally greater if F2 is implemented due to retention of the Wonderland

Hotel and Annex. Increased pedestrian and vehicular traffic would also create long- term, indirect negative major impacts on biotic communities.

In Millionaire's Row, Daisy Town, Society Hill and the Wonderland Club, the majority of the buildings are proposed to be retained, eliminating the potential for expansion of plant communities in those areas. The retention of buildings and the associated activities within the Little River floodplain in the area known as Millionaire's Row would result in a reduction in the area available for reestablishment of the globally imperiled montane alluvial forest.

Short- term, moderate, direct adverse effects to biotic communities are expected to occur during construction as well as indirect, long- term adverse impacts following project implementation. During construction, excavation would disturb vegetation and most likely require removal of smaller trees and root masses. The possible use of heavy equipment for removing buildings along with the vehicular and pedestrian traffic would likely cause temporary disturbance of plant communities. Under F2, the activities required for reconstructing the Wonderland Hotel and providing access to it and the Annex would require ground disturbance for installation of sewer, water and electrical lines, and paving of parking areas. Following construction, the expected increase in visitation, and the increase in pedestrian traffic would further increase the stress on plant communities and wildlife habitat.

Visitation under this alternative is estimated to be at the highest level of all project Alternatives. The higher visitation rate would be accompanied by a proportional increase in the improper storage and disposal of food items. Food brought into day use areas and garbage attracts wildlife, increasing the potential for human – wildlife encounters. Encounters with black bears, raccoons and even small rodents can be dangerous for both the human and the wildlife species involved. Increased traffic would also increase the potential for vehicular collisions with wildlife. These indirect, adverse effects on wildlife would be minor because they affect individuals and not entire populations..

4.8.2.2.2 Aquatic Communities
Direct, short- term, negligible, adverse effects to aquatic communities could result during implementation of Alternative F. These effects would occur during project implementation, primarily due to the ground disturbance, potential erosion, and runoff into surface waters that could occur following the use of heavy equipment. Installation of sewer, water, power, and phone lines will all result in temporary disturbance within and adjacent to the floodplain of the Little River. Protocols for project operations and impact avoidance measures have been developed by the Park to minimize the potential for adverse effects to biotic communities (see Section 2.2.1). Even with incorporation of these measures, the nature of the work may result in unavoidable, yet negligible discharges of sediment into aquatic environments.

The overall indirect effect to aquatic resources in the District would be minor, long- term, and adverse, resulting from an increase in impermeable surfaces and associated runoff into surface waters. Increased visitation will result in trampling

of vegetation and loss of soil stability. Increased traffic and parking will result in deposition of petrochemicals, that, when mixed with rainfall runoff, can result in contamination into adjacent aquatic systems.

4.8.2.3 Threatened, Endangered, Rare and Sensitive Species

Alternative F would have no direct effects on federal- listed threatened or endangered species, since none are known to occur within the proposed project implementation area. A state threatened species, butternut, and two State Special Concern species, Fraser's sedge (*Cymophyllus fraserianus*) and chamomile grapefern (*Botrychium matricariifolium*), occur within the District. Because many of the buildings would be retained under Alternative F, and visitation is expected to increase following project implementation, increases in suitable habitat for threatened, endangered, rare and sensitive species are expected to be negligible. Due to the increased visitation expected under Alternative F, the potential for trampling of herbaceous vegetation by pedestrians would also be elevated, indirectly resulting in long- term, minor adverse effects on these species. The chamomile grapefern is especially susceptible to the damage from trampling and the viability of its populations in the District is monitored by the Park for that reason.

The hellbender (*Cryptobranchus alleghaniensis alleghaniensis*), is a large aquatic salamander with a state designation of "deemed in need of management" (similar to State Special Concern status for plant species). This salamander is not known to occur at Elkmont, but a population does exist within the Little River, downstream from "The Sinks", a natural waterfall within the Park. As a result, any actions in the District that could impact habitat downstream or water quality within the Little River could indirectly affect the hellbender. Short- term, adverse effects to water quality during construction are expected to be minor. Following project implementation, increased impervious surfaces and associated runoff could result in minor adverse effects to water quality and could adversely affect aquatic species downstream, such as the hellbender.

Although it is not a federally or state- listed species, the synchronous firefly that has been observed in the District could benefit from expanded habitat as well; however, retention of most of the buildings would prevent an increase in grassy habitat from occurring following project implementation. Increased visitation could potentially result in long- term, moderate, adverse effects on synchronous firefly populations in the District.

Overall, the long- term indirect effects to threatened, endangered, rare and sensitive species is expected to be moderately adverse due to impacts on existing and potential habitat (Table 4- 13).

4.8.2.4 Wetlands

Direct, short- term, minor, adverse impacts to wetlands would occur as a result of implementing Alternative F. Under F1, all but 14 buildings would be retained (12 in F2) across all areas of the District. Installation of sewer, water, and electrical lines, and additional infrastructure required to support the buildings retained would require minor excavation and grading. Wetlands along Bearwallow Branch would be especially susceptible to the adverse effects of installing these infrastructure components.

The long- term, indirect effects on wetlands due to implementation of either of these alternatives are expected to be adverse, but minor. Wetlands may be indirectly adversely affected by the retention and use of adjacent buildings, such as those found in Millionaire's Row. The environment surrounding residential buildings has historically been subjected to runoff from impervious surfaces, soil compaction, deposition of petrochemicals, planting of non- native species and vegetation management. These types of chronic disturbances tend to result in loss of native plant diversity and subsequent degradation of wildlife habitat. Wetlands that abut residential properties would be subject to adverse effects resulting from these chronic disturbances.

Several wetland functions and values would be somewhat diminished, including wildlife habitat, aesthetic/visual quality, flood storage, water quality, and fish/shellfish habitat. As in all alternatives, the wetlands adjacent to Bearwallow Branch in Millionaire's Row would be most susceptible to these effects.

4.8.2.5 Water Quality

Potential short- term, minor adverse impacts to water quality could occur as a result of implementing Alternative F. Changes to surface water runoff rates and volumes would occur, and additional discharge of treated wastewater into the Little River would be required.

Both of these alternatives propose retention of most buildings throughout the District. However, activities associated with removal of some buildings and installation of infrastructure, including sewer and water lines, parking areas, and electrical service required under each alternative would create some ground disturbance caused by heavy equipment and the movement of construction vehicles to and from the areas containing the buildings. Although Best Management Practices would be followed, there would still be potential for erosion and sedimentation into water bodies to occur during project implementation, including in those areas where buildings are being restored, rehabilitated or reconstructed. This could result in a short- term, direct, minor adverse effect on water quality during construction. However, once disturbed areas are planted and vegetation has become established, some of these effects would be mitigated.

Retaining most of the buildings in this alternative would increase runoff compared to the No Action Alternative because more impervious surfaces would remain. In addition, 2.4 and 3.5 acres (see Table 4- 3) would be paved under F1 and F2, respectively. This would further increase the potential for runoff and soil erosion. Compared with the No Action Alternative, the increases in rainfall runoff due to pavement runoff under F1 and F2 (see Table 4- 5) are estimated at 5.6 and 6.9 percent, respectively. Therefore, long- term, indirect effects to water quality are expected to be minor and adverse.

<u>Sewage Treatment and Pollutant Discharge</u>

Alternative F includes rehabilitation of the Appalachian Club interior for day use, which requires public restroom facilities; rehabilitation of cabins in the Millionaire's Row, Society Hill and the Wonderland area for public lodging; and, if F2 is chosen, reconstruction of the Wonderland Hotel and Annex for lodging. The additional wastewater treatment for these improvements is estimated at 14,954 and 23,467 gallons per day for F1 and F2, respectively.

Because treated wastewater is discharged into the Little River, which has been designated an Outstanding National Resource Water, the discharge must not add any additional pollutants to the river or degrade the current water quality. In addition, because the State of Tennessee's environmental regulations prohibit expansion of the hydraulic capacity of the existing plant, the additional wastewater treatment would have to occur at an alternate location, either through addition of a drip irrigation system located in a suitable area outside of the District, or by piping the wastewater to the nearest treatment plant in Gatlinburg. If either of these methods were utilized, a separate investigation of the potential resource impacts associated with construction these systems would be required prior to implementation. Water quality standards for Outstanding National Resource Waters are expected to continue to be met at the Elkmont wastewater treatment plant because concentrations of contaminants would remain below the water supply maximum contaminant level at that location (See Table 4- 12). Because water quality standards for Outstanding National Resource Waters would continue to be met through the use of alternative treatment methods, no long-term effects to water quality are expected to result from increased wastewater discharge under F1 or F2.

There are not any baseline conditions established for thermal loading, other than typical wastewater temperatures of 60 degrees Fahrenheit (see Section 2.2.1); however, the incremental increase in effluent discharge resulting from these alternatives is such that temperature effects are expected to be negligible (McGill Associates 2004).The effluent discharge rate would remain the same as the existing condition under all alternatives. At the current rate of discharge, thermal impacts are dissipated entirely within three feet of the discharge pipe due to effluent mixing with cooler water in the pipe from the plant to the discharge point. Because the cooling would continue and the rate of discharge would remain the same under all alternatives, there would be no thermal impacts to the Little River as a result of implementing this alternative (McGill Associates 2004).

4.8.2.6 Floodplains

Short- term, minor, direct, adverse effects on the 100- year floodplain are expected to occur as a result of implementing Alternative F because of temporary increases in erosion and sedimentation expected during project implementation. Over the long term, implementation of Alternative F would create a moderately adverse effect on floodplains by increasing the amount of impervious surfaces and the erosion potential throughout most areas of the District. The parking areas, roadway improvements, and soil disturbance required to implement the portions of Alternative F that would accommodate the expected increase in visitation, and the visitation itself, would be detrimental to most native plant communities that allow for soil stabilization and precipitation infiltration. This effect would be most evident in Millionaire's Row, which was constructed around the floodplain of Bearwallow Branch.

Most buildings in Millionaire's Row would be retained, including three that lie within the 100- year floodplain limits (Miller (#46), Faust (#47) and Faust garage (#47A)). Use of these three buildings would be contrary to NPS policy that expressly prohibits development within floodplains and would therefore require a formal Statement of Findings if this alternative would be implemented. According to Director's Order #77- 2, the NPS must "avoid direct and indirect support of floodplain development and actions

that could adversely affect the natural resources and functions of floodplains or increase flood risks".

As part of the cabin rehabilitation process, utility services would be connected to the cabins. Although they would be installed below ground and would not occupy floodplain storage following construction, the vegetation and soils would be extensively disturbed as the lines are installed. Soils adjacent to Bearwallow Branch are composed of Spivey soils. These soils have a high organic content and, as such, are very susceptible to damage from vehicular traffic. As a result, extensive restoration of the floodplain of Bearwallow Branch to stabilize the streambank and reestablish vegetation would be required if Alternative F was implemented. In addition, work to restore and rehabilitate buildings in Millionaire's Row would eliminate the possibility of additional regeneration of the montane alluvial forest as well.

Soils adjacent to Bearwallow Branch are composed of Spivey soils. These soils have a high organic content and, as such, are very susceptible to damage from vehicular traffic. As a result, extensive restoration of the floodplain of Bearwallow Branch to stabilize the streambank and reestablish vegetation would be required if Alternative F was implemented. In addition, work to restore and rehabilitate buildings in Millionaire's Row would eliminate the possibility of additional regeneration of the montane alluvial forest.

One building that lies adjacent to the Little River floodplain will be removed (Young (#48). Like other alternatives that propose removal of buildings, benefits to floodplains would be experienced by reduction of impervious surfaces adjacent to floodplains.. Removing buildings in areas adjacent to floodplains would provide indirect benefits by increasing the area available for infiltration and eliminating potential future ground disturbance and soil compaction associated with residential use. Removal of the Young cabin in the floodplain would increase floodplain storage; however, the long- term effect of this action is expected to be negligible in terms of floodplain function.

4.8.2.7 Air Quality

As in the No Action Alternative, there would be a temporary increase in emissions under Alternative F due to operation of construction equipment during project implementation. Therefore, direct, adverse effects to air quality during construction would be short- term and negligible. These effects could be minimized by reducing equipment idling times, ensuring that all construction equipment is in good operating condition, and by performing construction during the time of year when ozone is least likely to form (April to September).

Visitation to the District is expected to rise following implementation of both F1 and F2 and air quality can be affected by accompanying increases in vehicular traffic and by how this traffic moves throughout the District. Increased engine idling times will generally occur as traffic congestion causes increases in travel time along roadways, within parking areas, at gates, and at destination points that are visible from the roadway, such as at wayside exhibits. As a result, projected increases in visitation would be accompanied by a lower level of service on roadways servicing the District and more emissions.

The results of an analysis was performed by the Park to evaluate the potential nitrogen deposition and nitrogen dioxide (NO2) impacts from the use of the proposed Appalachian Club and Wonderland Club parking lots show impacts very far below the nitrogen deposition threshold of 0.01 kilograms per hectare per year. In an independent air quality assessment performed by McGill Associates, based on a busy Saturday in summer, the projected increase in traffic was expected to result in an annual 8.03- ton increase in NOx emissions and a 11.31- ton increase in VOCs emissions in 2015. The increase in emissions for both pollutants is greater than 5 tons per year over the existing condition. Thus, indirect, long- term effects from Alternative F on air quality in the District would be adverse and major. Although this increase is insignificant when compared with total emissions in the Park, it is significant in terms of the VOCs and NOx that would be contributed to regional air quality degradation, as well as the immediate area of the District. Air quality in the Park region is already at unacceptable levels and has wide- ranging effects including decreased visibility, damage to vegetation, and human health problems. A comparison of emissions for the alternatives is provided in the Table 4- 8 at the end of this chapter.

4.8.3 Impacts on Interpretation and Visitor Use

4.8.3.1 Visitor Experience

Negligible, short- term direct effects to the visitor experience are anticipated to occur during implementation of Alternative F. These effects would be caused by increased noise, construction traffic, visual impacts, and degradation of air quality that could occur as a result of operating heavy machinery. Long- term, indirect effects on visitor experience are expected to be beneficial and major due to the addition of a variety of facilities and adverse and major, due to a significant increase in visitation.

The primary focus of this alternative is to provide public lodging operated by a private concessioner. The majority of the Wonderland Club, Society Hill and Millionaire's Row cabins are proposed for public lodging in both options of Alternative F. Under F2, the Wonderland Hotel would be reconstructed and the Annex restored and rehabilitated for use as public lodging and food service. Public lodging and a resource education program option would be operated by a private concessioner. This program would provide opportunities to guests staying in the Wonderland Hotel, Annex, and cabins, as well as the general public to experience education- based programs within the District and the Park. These programs would include, but not be limited to, such items as cultural resource education- based opportunities.

A variety of interpretive features and facilities are proposed under both F1 and F2. These components would provide long- term, major benefits to the visitor experience within Elkmont Historic District. Most cabins would be restored in Daisy Town and used for interpretive purposes. The Chapman cabin (#38) would be restored in Society Hill, allowing visitors to learn about Colonel Chapman's role in the establishment of the Park. An exhibit in Millionaire's Row would discuss the natural history of synchronous fireflies. The remainder of the cabins retained would be used for public lodging. Although removal of some of the buildings and restoration and preservation of others is not expected to significantly change visitor use, there would be a change in the level of interpretive efforts. Providing additional historical information in the Elkmont Nature

Trail brochure, orientation kiosk, ten wayside exhibits, and interior exhibits would create the opportunity for the visiting public to learn about the history of the Appalachian and Wonderland Clubs and train stations, the Little River Railroad Company and Colonel Townsend's role in the railroad and Elkmont's logging history, establishment and history of Elkmont, and the cultural and natural resources of the District.

In F2, the reconstructed Wonderland Hotel and restored and rehabilitated Annex would provide visitors the opportunity to stay overnight at the Hotel reconstructed to its historical configuration according to *The Secretary's Treatment Standards.*

4.8.3.2 Visitor Facilities

Visitor facilities would experience major, direct and indirect benefits as a result of implementing Alternative F. Most of the historic buildings throughout the District would be retained for a variety of uses. As discussed in Section 4.8.3.1, above, an orientation kiosk with exhibits and ten other wayside exhibits would be installed. These exhibits would provide visitors with information on the natural environment and interpret the cultural resources and the cultural landscape, while providing a historic perspective on prominent figures in Elkmont and the Park's history. Exhibits describing the natural and cultural history of the area would be placed strategically to orient visitors as they enter the District and most of the major sections of the District.

Like previous alternatives, additional benefits would be provided by the construction or repaving of six (F1) or seven (F2) parking areas in the District, repaving or widening several roads, construction of asphalt walking paths and restoration of the Appalachian Club, including interior exhibits and restroom facilities, for day use. Day use of the Appalachian Clubhouse would be operated by the concessioner and would not result in revenue for the Park to offset long- term costs associated with F1 or F2. Some of the areas in which visitors currently park are not paved and are eroded and rutted. Creation of pervious pavement lots would provide a stable surface for parking while preserving the aesthetic quality of the environment expected by the visiting public in a National Park.

The Wonderland Hotel lodging operations would be operated by a concessioner if F2 was implemented. In addition to lodging, visitors would have the option of dining at the Hotel and this service would be extended to all persons staying overnight in the cabins. The concessioner would also provide educational opportunities which would be made available to the hotel and cabin guests as part of their lodging fee. While these proposed opportunities at the Wonderland Hotel would provide a long- term direct benefit to visitor facilities, the NPS is required to first examine whether this is a necessary and appropriate use for facilities within a National Park (see discussion provided in Section 4.7.8). In addition, the decision regarding whether or not to reconstruct the hotel must follow Department of Interior guidelines. Both management policies reiterate that reconstruction can only occur upon specific written approval by the Director after a policy review at the Washington office level. If reconstruction is chosen, it would have to be undertaken in accordance with *The Secretary's Treatment Standards*, and the building would retain its status as contributing to the District even though it would not retain historic integrity of the fabric nor its authenticity (NPS 2000).

4.8.4 Impacts on Socioeconomic Environment

Alternative F would have no direct, indirect or cumulative effect on the socioeconomic environment.

4.8.4.1 Population and Environment

No direct or indirect effects on population and environment would result from implementation of Alternative F. As discussed in Section 3.4, the top local industry category includes businesses that have close ties to tourism. Recreation, accommodation and food service industries supply important service to visitors to the Park. Sevier County is one of the most popular vacation locations for people traveling within the United States. In 2003, the number of guest rooms available in Sevier County was 25,289 with hotel and motel rooms comprising 68 percent of the total. The market has indicated steady growth in cabin and condominium rentals as well (Lodging Resources, Inc. 2004).

Gatlinburg, as a gateway community, is the destination for lodging chosen by many visitors to the Park and visitation to Gatlinburg mirrors the trend of visitation to the Park. Elkmont is located in Sevier County, Tennessee. Sevier County has an estimated population of 73,703, which represents an approximate increase of 39 percent from 1990 to 2000. This increase in population is also reflected in the increased visitation to the Park and the District as well. During the past 30 years, the average number of annual visits attributed to the District has been approximately 350,000. In 2001, annual visitation to the District was approximately 375,000. Projections for visitation to the District range from a low of 409,852 in 2006 to a high of 459,023 in 2015 based on the current condition, irrespective of the alternative selected for the District (Table 3- 19). Considering the increase in visitation to the area, it is logical to conclude that additional lodging and food service accommodations would be required in the area in future years. As a result, there would be no effect on existing local populations as a result of implementing an alternative that includes pubic lodging, as is proposed in Alternative F.

4.8.4.2 Land Use

Implementation of Alternative F would indirectly result in long- term, moderate adverse effects to land use. These effects would occur through retention of a large number of buildings for public lodging and by providing a variety of additional opportunities for those uses described in the land use zone designations in the 1982 General Management Plan that would result in an increase in the visitation to the District and the internal trips within the District (see Tables 4- 6 and 4- 7). Implementation of Alternative F would continue to allow for use of public roadway corridors, accommodations at the existing quarters, and picnicking and camping at the Elkmont Campground. Historical and natural resource interpretation would be increased over that which is currently offered through installation of a variety of exhibits, retention of some buildings for interpretive uses and the Appalachian Clubhouse as a public day use rental facility and self- guiding museum. Public lodging would be provided in cabins some portions of the District and, in F2, also at the Wonderland Hotel and Annex.

These uses would be supported by alterations and additions to existing infrastructure including new parking areas, restroom facilities, electric and water connections, and an upgrade to the wastewater treatment plant. Increased visitor opportunities within the District are expected to result in land use conflicts including degradation of air quality, visual and aesthetic impacts, traffic congestion and crowding.

4.8.4.3 Access and Circulation
Alternative F would create direct, short- term, minor, adverse effects on access and circulation during construction as traffic delays are created by movement of construction vehicles to and from the District. Over the long term, major, adverse effects on traffic and circulation would occur within the District. Alternative F proposes public lodging at cabins in three areas of the District, exterior restoration of cabins for use as interpretative exhibits and overnight accommodations and dining facilities for the general public at the Wonderland Hotel (if F2 is chosen). Compared to the No Action Alternative, the estimated change in volume of trips along District roads is 1,625 per day (2,057 if F2 is chosen). A comparison of estimated change in volume of trips between alternatives is provided in the summary tables at the end of this chapter.

To alleviate potential conflicts between vehicles and pedestrians, a number of roadway modifications are included. However, even with modifications, the level of service in some areas would be reduced under Alternative F (from A to C). The Level of Service describes operational conditions within a traffic stream, with Level A representing free flow traffic, up to Level F in which traffic delays can be severe. A change from Level A to Level C would result in a decrease in average travel speed, increased percentage of time spent following and reduced headway between vehicles.

4.8.5 Impacts on Other Resources

4.8.5.1 Viewshed
Impacts to visual quality consist of changes that would alter or obstruct (1) visible landscape features from dominant viewpoints established as part of this analysis; and (2) access and visibility to dominant or important viewpoints or sequences of viewpoints. The primary viewpoints or sequences of viewpoints within the District are from existing roadways and trails. Currently, the building grounds are closed to the public and access to many of the viewpoints within the District is prohibited due to safety concerns related to the conditions of the buildings.

The established baseline for this environmental analysis and the associated visusal analysis is the No Action Alternative. This baseline identifies a naturally regenerated landscape within the study area as the condition for the visual analysis. The buildings within the study area are considered obstructions to the natural viewshed that would be removed if the General Management Plan (the No Action Alternative) was implemented. As a result, long- term, indirect, major, adverse effects would be created by retention of buildings in all areas of the District (including the reconstructed Wonderland Hotel and restored / rehabilitated Annex under F2). Retention of these buildings would adversely affect visual quality by obstructing the natural viewshed. Very little area would be available for restoration of native plant communities due to retention of the buildings and structures, as well as installation of new infrastructure components that will further degrade visual quality (parking areas, paths, electrical, sewer and water supply components Direct, adverse impacts to the District viewshed are expected to occur during implementation of Alternative F because of the presence of machinery and ground disturbance but these effects would be short- term and negligible.

The viewshed sensitivity maps shown in the Visual Quality Assessment (Appendix D) indicate the areas visible from a variety of viewpoints throughout the District. The

direct effect on the composite viewshed would also be long- term, major, and adverse under Alternative F due to retention of most buildings, structures, and cultural landscape components. Composite viewshed areas shown (Figures 7, 8 and 9, Appendix D) would also be adversely impacted by building retention with regard to the area that is visible from the transportation corridors.

4.8.5.2 Soundscape

Direct, short- term, minor adverse effects on the soundscape are expected to occur during project implementation due to construction activities. The high noise levels of combustion- powered equipment, particularly due to earth moving equipment (usually diesel), are expected to be the primary contributor to the sound levels during construction and can interfere with the ability of individuals near the work site and passersby to hear speech. Peak noise levels from construction as measured at a distance of 50 feet may vary from 70 dBA to 100 dBA. The major construction activities of this project may include removal of buildings, hauling, grading, and paving, as well as restoration and rehabilitation of buildings or construction of new facilities. Overall, construction noise is relatively short in duration and would be restricted to daytime hours at the time of year in which visitation is expected to be the lowest.

Future noise levels under Alternative F are expected to be in the 50 to 60 dBA range, with maximum levels (over short periods of time) exceeding 70 dBA for loud vehicles. As in the No Action Alternative, since these average noise levels do not exceed the noise abatement criteria of 67 dBA, Alternative F would have no long- term effect on noise in the District.

4.8.6 Impacts on NPS Operations

As is the case with all alternatives, the buildings and associated grounds would remain closed while project implementation is occurring. In addition to removal of historic buildings, Alternative F includes modifications to existing infrastructure, restoration of cabins for interpretive exhibits and restoration and rehabilitation of the Appalachian Club for day use. Reconstruction of the Wonderland Hotel in conjunction with restoration and rehabilitation of the Annex is also proposed in F2. Public lodging would be provided at all cabins retained with the exception of those in Daisy Town and the Chapman cabin (#38) in Society Hill, which would be used for interpretive purposes.

Alternative F would create indirect, adverse effects on NPS operations. The need for funds or staff to protect the buildings from vandalism or further deterioration would be increased in this alternative respective to all others previously discussed. Although maintenance of the cabins, Wonderland Hotel and Annex would be the responsibility of the concessioner, funds and staff would be required to maintain the buildings retained in Daisy Town, the Chapman cabin (#38), the interpretive exhibits, and the day use facilities at the Appalachian Clubhouse, as well as the general infrastructure (roadways, parking lots, walkways, water supply and wastewater systems). Maintenance activities would include such items as mowing, road repairs, daily cleaning and supply of public restrooms, repair of structural damage to buildings not operated by the concessioner, and general maintenance of utilities and infrastructure.

The concessions services included in Alternative F would have a direct, adverse impact on the NPS concessions management program as a result of the substantial increase in

the workload for this program. The increased workload would begin with project planning and would continue through the opening and operation of the new facilities. Concessions management would be heavily involved in planning for new facilities and services, selection of a concessioner, completion of capital improvements required, transition to a new concession contract, and overseeing actual operation by the concessioner. It is anticipated that funding would be required for a full- time GS- 9 or GS- 11 Concessions Management Specialist/Assistant to supplement the current staffing in this program of one Concessions Management Specialist. Funding for an additional vehicle, office space, and office equipment for this position would also be required.

The need for law enforcement would also increase significantly as a result of increased visitation, potential traffic and circulation problems, increased encounters with wildlife, and other emergencies that may arise. Law enforcement needs are expected to change significantly to the extent that housing and funding for a full- time ranger (level GS- 9) would be required to police the exhibits and buildings retained.

NPS would continue to manage vegetation to provide for visitor safety. Hazard trees adjacent to exhibits, trails, roadways and buildings would continue to be removed as needed to reduce the possibility that visitors could be harmed by falling trees. The indirect effect on NPS operations due to hazard tree and other vegetation management is expected to be long- term and moderately adverse because most of the District buildings and the grounds would be open to the public.

4.8.7 Cumulative Effects

Retaining most of the buildings throughout the District, in conjunction with increased visitation and the level and type of use proposed under Alternative F would essentially leave no opportunity for expansion of existing plant communities, including the globally imperiled montane alluvial forest. Montane alluvial forests are considered imperiled because only six to twenty examples of this community type are known to exist globally. In the Southern Appalachian Mountains, alluvial floodplain forests have been severely impacted and losses have occurred as a result of intensive land use and development in relatively flat and highly productive valley bottoms. Outside of the National Park, there are no assurances these areas will remain in forest. Implementation of Alternative F would result in a long- term, major, cumulative adverse effect because the opportunity to reestablish this rare plant community within the Park would be eliminated.

The impacts of implementing Alternative F on floodplains and wetlands would be primarily limited to the District and the Little River watershed. This alternative would create long- term, minor adverse effects on wetlands and floodplains by preventing the reestablishment of plant communities in areas where buildings are retained. Only six water bodies in the State of Tennessee are designated as Outstanding National Resource Waters. Four of these waters are located within the Park, one of which is the Little River. All development within the watersheds of these four water bodies is strictly regulated to prevent water quality degradation. Although water quality in the Little River and its tributaries has remained excellent, contributions of sediments from erosion or petrochemicals originating from parking area runoff can add to the existing load entering the river system. The increase in runoff anticipated under Alternative F would contribute to the adverse, cumulative effect of contaminants entering the river from surrounding communities and from other land uses within the Park.

The increased visitation and internal traffic within the District to view exhibits would create a long- term, major, adverse effect on air quality. The effect of increases in NOx and VOC emissions resulting from implementation of Alternative F is very small when compared to overall emissions in the Park and in the region. However, because the entire Park is designated a non- attainment area and a Class I area under the Clean Air Act (the highest level of air quality protection) even a small increase adds to already degraded air quality and constitutes a long- term adverse cumulative effect.

The removal of one to three contributing buildings under Alternative F is less than all other alternatives described previously. The removal of these three contributing buildings would result in a permanent, adverse effect, but the overall cumulative effect to cultural resources would be minor because most of the historic buildings would be retained throughout the District. Two of the three contributing buildings proposed for removal have already collapsed, and the third, the Wonderland Hotel Annex is in poor condition. Retention of most of the buildings and cultural landscape components would result in preservation of the only remaining representative group of buildings constructed during that period of significance in the Park.

Invasive, non- native plant species thrive in disturbance areas. The spread of invasive, non- native species could be further exacerbated by increased disturbance caused by pedestrian traffic into sensitive areas. Failing to continue an invasive, non- native species management program at Elkmont Historic District could, over time, result in the spread of those species into other areas of the Park adding exponentially to the existing adverse effects that invasive species have on the Park's botanical diversity.

In addition, cumulative adverse effects to NPS operations would also occur as a result of implementing Alternative F, primarily due to the costs of project implementation and operations within the District following project completion. Even with a projected shortfall in funding of approximately $1.1 million in 2004, every law enforcement position continues to be filled immediately so that the safety and emergency response expected by visitors is not compromised. As a result, if F1 or F2 is implemented, funding of the entire project implementation (approximately $22.5 million for F1 and $30.2 million for F2) would have to be provided from another source. Additional funds would have to be reallocated from other programs in the Park to meet maintenance and law enforcement needs. Both of these economic needs would result in long- term, major, adverse cumulative impacts on Park operations.

4.8.8 Conclusion

Implementation of Alternative F would create major impacts to native plant communities where buildings are retained, resulting in a loss of potential for the long-term recovery of these resources. Disturbances to the forested ecosystem due to the retention of buildings and associated activities under this alternative would eliminate critical biological components necessary for characteristic forest stand development over time. The specific species composition and temporal component required for the globally imperiled montane alluvial forest to become reestablished at this site would be eliminated if this alternative was implemented.

Intensive development within the floodplain and watershed of the Little River would result in increased degradation of the water quality of this designated Outstanding

National Resource Water. Other resources whose productivity would be adversely affected or limited as a result of implementing Alternative F include soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for threatened, endangered, rare and sensitive species, and water quality. Under Alternative F, the overall long- term productivity of biotic resources would be adversely affected due to the retention of buildings, paving, installation of infrastructure, and increased visitation expected throughout the District.

Direct, long- term, major beneficial effects would be created by the retention of the Appalachian Clubhouse, the 16 Daisy Town cabins, the Chapman cabin (#38), the cabins in the Millionaire's Row and Wonderland Club areas, and the retention of many of the District's cultural landscape characteristics and features. Reconstruction of the Wonderland Hotel as a contemporary re- creation of the original building under F2 would provide direct benefits to cultural resources and to visitor use facilities. These features would also provide more opportunities for cultural resource interpretation. The expanded interpretive opportunities, providing access to trails and exhibits, and correction of erosion problems at culverts are all beneficial effects. Other areas that would benefit from Alternative F are visitor facilities and visitor experience.

Irretrievable commitments of resources would result if either F1 or F2 was implemented. In terms of NEPA impact thresholds developed for this project, these commitments would result in direct, permanent, minor adverse effects on three contributing buildings, and cultural landscape characteristics and features (mainly "spatial organization" and "buildings and structures"; see Table 3- 3) principally due to removal of buildings from the District. Indirect, moderate, adverse effects on the landscape would include wear and tear on features in the Appalachian Club and other interpretive features in Daisy Town and at the Chapman cabin (#38) due to increased internal trips to view exhibits and increased visitation.

Implementing Alternative F would result in unavoidable adverse impacts to many of the natural resources, including soils, floodplains, aquatic and terrestrial communities, wetland functional values, habitat for species of concern and water quality. These effects would occur due to retention of buildings in the floodplain, increased area of impervious surfaces, increased visitation and subsequent pedestrian traffic along with greater potential for soil compaction and damage to vegetation from trampling, loss of potential for reestablishment of montane alluvial forest and increased potential for human-wildlife encounters. Two cabins (Miller (#46) and Faust (#47)) and one garage would be retained within the 100- year floodplain under this alternative. This action would require a statement of findings and this proposed use would be contrary to National Park Service policy. There would be an irreversible commitment of resources due to elimination of up to 22 acres of potential montane alluvial forest habitat where buildings are retained.

Alternative F increases the potential for major adverse effects to archeological resources. There is also more potential for irreversible impacts to archeological resources as a result of implementation of these alternatives, but it is possible that those effects could be eliminated or minimized through proper planning and avoidance measures. The potential for adverse impacts to archeological resources increases with additional ground disturbance. The excavation required for installation of sewer, water and electrical lines is increased over all alternatives previously discussed. There is potential

for adverse effects to archeological resources as a result of implementing these alternatives, but these effects could be eliminated through proper planning and avoidance measures.

Greater visitation would result in degradation of air quality, additional wildlife habitat disturbance and wildlife / human encounters, more ground disturbance to install infrastructure components, creation of more parking spaces to accommodate increased traffic and additional costs to NPS operations for staffing and maintenance of the buildings and infrastructure, vegetation management, management and implementation of the concessions contract, and additional law enforcement to deal with the impacts of increased visitation. Increased visitation would also result in adverse effects on land use due to crowding and traffic congestion. Compared with all previous alternatives discussed, these alternatives also would provide less opportunity for benefits to native plant communities as restoration and revegetation are proposed throughout less of the District.

The proposed concession operation under F1 would allow the concessioner to rent 36 cabins and to provide the fee- based resource education options to guests as described earlier in this section. Under F2, the concessioner would have the ability to rent the cabins, as well as the reconstructed Wonderland Hotel and the Annex, and the opportunity to provide food service to all of the lodging guests and other public visitors. Day use of the Appalachian Clubhouse would be operated by the concessioner and would not result in revenue for the Park. The estimated total cost in 2007 dollars of implementing F1 is approximately $22.5 million and for F2 is $30.2 million (see Appendix C). These costs include the initial investment to modify the existing infrastructure to accommodate more visitors. Infrastructure costs are estimated at approximately $3.8 million in F1 and $4.2 million in F2. The infrastructure costs in F1 are associated with connecting cabins to the water supply and wastewater systems. The additional funds for installation of the infrastructure in F2 represent the costs of providing water, wastewater, and parking for the Wonderland Hotel. Of the total gross construction costs, approximately $6.1 million would be required to reconstruct the Hotel, restore and rehabilitate the Annex, and install the necessary infrastructure components to support the use proposed under F2 for these buildings.

As part of this planning process, the economic feasibility of F2 was examined (Lodging Resources 2004). The study indicated that the concessioner would not be able to make an initial investment in any of the capital improvements other than furniture, fixtures and equipment (FFE) necessary to run their operation and still have a reasonable opportunity to make a profit under F2. Although the study did not analyze the financial feasibility of F1, the projected income and profit in this alternative would be expected to be significantly lower since the Hotel and Annex would not be part of the concession operation. While is it possible that a concessioner could operate at a profit under F1, given that the concessioner would have 36 cabins to rent, a thorough economic analysis of this alternative would have to be completed if it is selected for implementation. The Lodging Resources study should be viewed as a preliminary review only and conclusions regarding financial feasibility as only tentative. If either Alternative F1 or F2 are selected, a more thorough analysis of the selected alternative would be required to verify the feasibility of these alternatives and to develop a concessions contract.

Per the terms of 16 USC Sec. 1a 5, and NPS *Management Policies* (2000), the NPS is responsible for determining whether or not concessions operations are necessary and appropriate "for public use and enjoyment of the National Park System in which they are located". A variety of legal policy requirements must be referenced in this analysis. Some of the considerations of these requirements include:

- the potential for adverse effects to Park resources that may be caused by a concessions operation;
- the suitability of the location proposed for commercial services and its proximity to existing services;
- the necessity of the concessions for the public to use and enjoy resources within the Park;
- the consistency of the concessions plan with conservation and preservation of natural resources;
- the ability to incorporate sustainable principles and practices in planning, sighting, construction, utility systems, selection, and recycling of building materials, and waste management;
- the ability of the concessions operation to enhance visitor use and enjoyment without causing unacceptable impacts to resources; and
- development of facilities and services restricted only to those necessary to achieve the Park's purposes.

Overnight use for the purpose of historic preservation at Elkmont was considered appropriate, however, based on the considerations listed above and other considerations found within 16 USC Sec. 1a 5 and NPS *Management Policies* (2000), the NPS has determined that the concession operations proposed in Alternative F are not necessary and appropriate and therefore, should not be implemented within the Elkmont Historic District.

4.9 Summary Tables and Impact Matrix

Tables provided in this section include supporting information for the effects discussion and compare the estimated effects of each alternative. An impact matrix (Table 4- 13) is provided as well, which includes details regarding some of the potential beneficial and adverse effects listed by resource for each alternative.

Table 4- 2: Potential Effects to Known Archeological Resources in the Elkmont Historic District

			Effect by Project Alternative							
Site	**Locus**	**Assessment**	**No Action Alternative**	**Alternative A**	**Alternative B**	**Alternative C**	**Alternatives D1 and D2**	**Alternatives E1 and E2**	**Alternatives F1 and F2**	**Additional Work Required and/or Potential Avoidance/Mitigation Strategy**
40SV120										
	Locus A	Potentially significant resource	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a, b)	Potential adverse effect (a, b)	Potential adverse effect (a, b)	Potential adverse effect (a, b)	Potential adverse effect (a, b)	(a) Monitor and/or survey beneath buildings to be removed or rehabilitated if potential impacts to those areas. Further investigation of prehistoric deposits and/or implementation of protective measures. Avoid potentially significant historic deposits at Appalachian Clubhouse and Cabin #2. (b) Further investigation or avoidance of potentially significant historic deposits northeast of Appalachian Clubhouse.
	Locus B	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus C	Potentially significant resource	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	(a) Avoid potentially significant historic deposits at Cabin #38. Monitor and/or survey beneath buildings as necessary.
	Locus D	Significant resource	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a, c)	(a) Complete survey around buildings and assess any additional prehistoric or historic resources. Monitor and/or survey beneath buildings as necessary. (c) Further investigation of prehistoric deposits and/or avoidance through movement/reconfiguration of Day Use/Jakes Creek Trail parking area.
	Other Areas	Unsurveyed	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	(a) Complete survey around buildings, and assess any additional prehistoric or historic resources. Monitor and/or survey beneath buildings as necessary.
40SV121										
	Locus A	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus B	Potentially significant resource	No effect	No effect	Potential adverse effect (d)	Potential adverse effect (d)	Potential adverse effect (d)	Potential adverse effect (d)	Potential adverse effect (d)	(d) Further investigation of prehistoric deposits, and/or avoidance through relocation of water line or use of disturbed areas along existing road or trenches.
40SV122										
	Locus A	Potentially significant resource	No effect	No effect	Potential adverse effect (e)	Potential adverse effect (e)	Potential adverse effect (e)	Potential adverse effect (e,f)	Potential adverse effect (e,f)	(e) Further investigation of prehistoric deposits and/or avoidance through movement/reconfiguration of Little River Trail parking area. (f) Further investigation of prehistoric deposits, and / or avoidance through relocation of water line.
	Locus B	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus C	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus D	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus E	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	

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Table 4- 2: (continued)

Site	Locus	Assessment	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternatives D1 and D2	Alternatives E1 and E2	Alternatives F1 and F2	Additional Work Required and/or Potential Avoidance/Mitigation Strategy
	Other Areas	Unsurveyed	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	(a) Complete survey around buildings, and assess any additional prehistoric or historic resources. Monitor and/or survey beneath buildings as necessary.
40SV123										
	Locus A	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus B	Potentially significant resource	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a, g)	Potential adverse effect (a, g)	Potential adverse effect (a, g)	(a) Complete survey around building, and assess any additional prehistoric or historic resources. Monitor and/or survey beneath buildings as necessary. (g) Further investigation of prehistoric deposits and/or avoidance through movement/reconfiguration of road.
40SV124										
	Locus A	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus B	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
40SV125										
	Locus A	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus B	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus C	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus D	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	
	Locus E	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus F	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
40SV165										
	Locus A	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
40SV166										
	Locus A	Potentially significant resource	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a)	Potential adverse effect (a, h)	Potential adverse effect (a, h)	Potential adverse effect (a, h)	(a) Complete survey around buildings, and assess any additional prehistoric or historic resources. Monitor and/or survey beneath buildings as necessary. (h) Monitor ground- disturbing activities associated with Wonderland Hotel parking lot construction.
	Locus B	Potentially significant resource	No effect	No effect	No effect	No effect	Potential adverse effect (i)	Potential adverse effect (i)	Potential adverse effect (i)	(i) Further investigation of prehistoric deposits and/or avoidance through relocation of sewer line.
	Locus C	Non- significant resource	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	
	Locus D	Potentially significant resource	No effect	No effect	No effect	No effect	No effect	No effect	No effect	

(a) - Structural removal, rehabilitation, or reconstruction (reconstruction for Wonderland Hotel only).
(b) - Sewer line construction between Bearwallow Branch and Jakes Creek.
(c) - Day Use/Jakes Creek Trail parking area.
(d) - Water line construction between Jakes Creek and water treatment facility.
(e) – Little River Trail parking area
(f) – Water line construction along Little River Trail
(g) - Road improvement
(h) - Wonderland Hotel parking area
(i) – Sewer line construction along road

Table 4- 3: Area Restored to Native Species and Additional Area Paved by Alternative

Alternative	Area Restored at Former Building Sites		Area Available for Reestablishment of Montane Alluvial Forest		Area Paved	
	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)
No Action	2.41	0.98	22	9	0	0
A	2.41	0.98	22	9	0	0
B	2.04	0.83	22	9	1.3	0.5
C	1.88	0.76	22	9	1.3	0.5
D1	1.64	0.66	12	5	1.5	0.6
D2	1.17	0.47	12	5	2.1	0.9
E1	1.44	0.58	0	0	1.5	0.6
E2	0.97	0.39	0	0	3.0	1.2
F1	0.79	0.32	0	0	2.4	1.0
F2	0.32	0.13	0	0	3.5	1.4

Table 4- 4: Roadway and Parking Area Runoff Constituents and Their Primary Sources*

Constituent	Primary Source(s)	Range of Average Concentration or Typical Loading (milligrams per liter)
Solids	Pavement wear, vehicles, atmospheric deposition, maintenance activities	437 – 508
Total Kjeldahl Nitrogen (TKN)	Atmospheric deposition, roadside fertilizer application	0.335 – 5.80
Phosphorus	Atmospheric deposition, roadside fertilizer application	0.113 – 0.202
Lead	Leaded gasoline from auto exhaust, tire wear (lead oxide filler material)	0.073 – 0.244
Zinc	Tire wear, motor oil, grease	0.056 – 0.143
Iron	Auto body rust, steel highway structures, moving engine parts	2.429 – 3.216
Copper	Metal plating, bearing and brushing wear, moving engine parts, brake lining wear, fungicides, and insecticides	0.022 – 0.723
Cadmium	Tire wear, insecticide application	0.001 – 0.005
Chromium	Metal plating, moving engine parts, brake lining wear	0.0001 – 0.004
Manganese	Moving engine parts	1.062
Sodium	Deicing salts	1.95 kg/hectare/yr
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving	0.053
Petroleum	Spills, leaks, of motor lubricants, anti- freeze and hydraulic fluids; asphalt surface leachate	**

*Concentrations taken from a report published in 1995 by the Center of Research in Water Resources, The University of Texas at Austin entitled, "A Review and Evaluation of Literature Pertaining to the Quantity and Control of Pollution from Highway Runoff and Construction, 2nd edition, Technical Report CRWR 239"
** none: a maximum contaminant level has not been established

Table 4- 5: Total Annual Rainfall Runoff (2001 Rainfall Data)

Alternative	Roadway Rainfall Runoff (mcf)*	Parking Rainfall Runoff (mcf)*	Total Rainfall Runoff (mcf)*	Increase in Pavement Runoff Compared to Existing Condition (%)
Existing Conditions	4.93	0.094	5.02	0
No Action	4.93	0.094	5.02	0
A	4.93	0.094	5.02	0
B	4.97	0.091	5.06	0.8
C	4.97	0.091	5.06	0.8
D1	5.04	0.091	5.13	2.2
D2	5.08	0.193	5.27	4.9
E1	5.11	0.193	5.30	5.6
E2	5.11	0.257	5.37	6.9
F1	5.11	0.193	5.30	5.6
F2	5.11	0.257	5.37	6.9

Source: McGill Associates 2004
* mcf – million cubic feet

Table 4- 6: Daily Trip Generation Summary

	Daily Trips by Alternative									
Trip Generator	No- Action	A	B	C	D1	D2	E1	E2	F1	F2
Trails	144	144	144	144	144	144	144	144	144	144
Campground	660	660	660	660	660	660	660	660	660	660
Backcountry	6	6	6	6	6	6	6	6	6	6
Day- Use	530	530	530	530	558	558	558	558	568	568
Hotel	0	0	0	0	0	156	0	518	0	518
Cabins	0	0	0	0	64	64	110	110	320	320
Clubhouse	0	0	64	64	66	66	75	75	81	81
Exhibits	0	0	626	919	964	964	911	911	1,380	1,380
Total Daily Trips	1,340	1,340	2,030	2,323	2,462	2,618	2,464	2,982	3,159	3,677
Internal Vehicular Trips	330	330	330	330	340	363	404	505	524	610
% Internal Capture	24.6%	24.6%	16.3%	14.2%	13.8%	13.8%	16.4%	16.4%	16.6%	16.6%
External Trips	1,010	1,010	1,700	1,993	2,122	2,255	2,060	2,477	2,635	3,067
Change in Volume of External Trips From Background	0	0	690	983	1,112	1,245	1,050	1,467	1,625	2,057

Source: McGill Associates 2004

Table 4- 7: Estimated Daily Number of Internal Trips by Alternative

Alternative	Internal Trips (Daily)	
	Two- Way Vehicular	Pedestrian
No- Action	165	431
A	165	431
B	165	435
C	165	435
D1	170	447
D2	182	479
E1	202	501
E2	253	627
F1	262	666
F2	305	775

Source: McGill Associates 2004

Table 4- 8: Estimated Air Pollutant Emissions by Alternative, Year 2015

Alternative	NO_x			VOCs		
	Total Emissions (tons/day)	Total Emissions (tons/year)	Increase over the No Action (tons/year)	Total Emissions (tons/day)	Total Emissions (tons/year)	Increase over the No Action (tons/year)
No Action	0.138	50.37	N/A	0.199	72.64	N/A
A	0.138	50.37	0	0.199	72.64	0
B	0.138	50.37	0	0.199	72.64	0
C	0.138	50.37	0	0.199	72.64	0
D1 & D2	0.146	53.29	2.92	0.210	76.65	4.01
E1 & E2	0.156	56.94	6.57	0.225	82.13	9.49
F1 & F2	0.160	58.40	8.03	0.230	83.95	11.31

Source: McGill Associates 2004

Table 4- 9: Estimated Noise Levels in the Elkmont Historic District by Alternative

Alternative	Average Range of Noise Levels (A- weighted Decibel Scale)	Maximum Noise Levels (A- weighted Decibel Scale)
No Action	35 - 60	60
A	35 - 60	60
B	50- 60	60
C	50- 60	60
D1 & D2	50- 60	70
E1 & E2	50- 60	70
F1 & F2	50- 60	70

Source: McGill Associates 2004

Table 4- 10: Projected Wastewater System Design Capacity by Alternative

Alternative	Additional Design Capacity (gallons per day)	Total Design Capacity (gallons per day)	Total Projected Peak Day Flow (gallons per day)
No Action*	None	35,000	31,300
A	None	35,000	31,300
B	None	35,000	31,300
C	None	35,000	31,300
D1	None	35,000	32,268
D2	None	35,000	33,635
E1	None	35,000	35,888
E2	5,000	40,000	44,375
F1	5,000	40,000	44,954
F2	15,000	50,000	53,467

Source: McGill Associates 2004
*represents the capacity of the existing wastewater treatment plant servicing Elkmont Campground

Table 4- 11: Estimated Discharge Pollutants by Alternative

	Flow (gallons per day)	BOD (mg/l)*	TSS (mg/l)	BOD (lbs)*	TSS (lbs)
Baseline	12,291	6.2	3.5	0.64	0.36
Alternative E2	26,666	2.9	1.6	0.64	0.36
Alternative F1	27,245	2.8	1.6	0.64	0.36
Alternative F2	35,758	2.1	1.2	0.64	0.36

Source: McGill Associates 2004
*mg/l = milligrams per liter
lbs = pounds

Table 4- 12: Annualized Average Constituent Loading for Alternative F2

Constituent	Concentration Based Loading to Stream (mg/l)	Concentration Based Loading in Stream (mg/l)	Water Supply Maximum Contaminant Level (mg/l)
Solids	437	2.3225570	none *
Total Kjeldahl Nitrogen	0.335	0.0017804	10.0
Phosphorus	0.113	0.0006006	none *
Lead	0.073	0.0003880	0.05
Zinc	0.056	0.0002976	5.0
Iron	2.429	0.0129096	0.3
Copper	0.022	0.0001169	1.0
Cadmium	0.001	0.0000053	0.01
Chromium	0.0001	0.0000005	0.05
Manganese	1.062	0.0056443	0.05
Sodium	n/a	n/a	none *
Nickel	0.053	0.0002817	250
Petroleum	2.7	0.0143499	none *

Source: McGill Associates 2004
* a maximum contaminant level is currently not established
mg/l = milligrams per liter

Table 4- 13: List of Potential Effects (per NEPA) by Alternative

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
CULTURAL RESOURCES										
Buildings	Direct, permanent, major, adverse—49 contributing buildings removed; no indirect or beneficial effects	Direct, permanent, major, adverse—49 contributing buildings removed; no indirect or beneficial effects	Direct, permanent, major, adverse—36 contributing buildings removed; indirect, permanent, minor, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of some buildings, and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, major, adverse—31 contributing buildings removed; indirect, permanent, minor, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of some buildings, and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, major, adverse—24 contributing buildings removed; indirect, permanent, minor, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of some buildings, and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, major, adverse—22 contributing buildings removed; indirect, permanent, minor, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of some buildings (Wonderland Hotel reconstructed and Annex restored and rehabilitated), and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, moderate, adverse—19 contributing buildings removed; indirect, permanent, moderate, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of many buildings, and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, moderate, adverse—17 contributing buildings removed; indirect, permanent, moderate, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of many buildings (Wonderland Hotel reconstructed and Annex restored and rehabilitated), and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, minor, adverse—three contributing buildings removed; indirect, permanent, moderate, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of most buildings, and treatment measures according to *The Secretary's Treatment Standards*	Direct, permanent, minor, adverse—one contributing building removed; indirect, permanent, moderate, adverse—increased visitation, traffic, wear and tear; direct, long-term, minor to major, beneficial—retention of most buildings (Wonderland Hotel reconstructed and Annex restored and rehabilitated), and treatment measures according to *The Secretary's Treatment Standards*
Cultural Landscape	Direct, permanent, major, adverse—loss of landscape characteristics and features due to removal of buildings; no indirect effects; direct, long- term, minor, beneficial—retention of a few landscape characteristics and features	Direct, permanent, major, adverse—loss of most landscape characteristics and features due to removal of buildings; no indirect effects; direct, long- term, minor, beneficial—retention of a few landscape characteristics and features	Direct, permanent, moderate, adverse—loss of landscape characteristics and features due to removal of buildings; indirect, long- term, minor, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of some landscape characteristics and features	Direct, permanent, moderate, adverse—loss of landscape characteristics and features due to removal of buildings; indirect, long- term, minor, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of some landscape characteristics and features	Direct, permanent, moderate, adverse—loss of landscape characteristics and features due to removal of buildings; indirect, long- term, minor, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of some landscape characteristics and features	Direct, permanent, moderate, adverse—loss of landscape characteristics and features due to removal of buildings; indirect, long- term, minor, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of some landscape characteristics and features	Direct, permanent, moderate, adverse—lesser loss of landscape characteristics and features due to removal of fewer buildings; indirect, long- term, moderate, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of more landscape characteristics and features	Direct, permanent, moderate, adverse—lesser loss of landscape characteristics and features due to removal of fewer buildings; indirect, long- term, moderate, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of more landscape characteristics and features	Direct, permanent, minor, adverse—minimal loss of landscape characteristics and features due to removal of small number of buildings; indirect, long- term, moderate, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of most landscape characteristics and features	Direct, permanent, minor, adverse—minimal loss of landscape characteristics and features due to removal of small number of buildings; indirect, long- term, moderate, adverse—increased visitation, traffic, wear and tear; direct, long- term, minor, beneficial—retention of most landscape characteristics and features
Archeology	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 4 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 4 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 6 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 6 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major, adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected	Direct, permanent, potentially major, adverse or no effect if resource is avoided; up to 1 significant locus, 7 potentially significant loci, and two unsurveyed areas would be adversely affected

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Table 4- 13: (continued)

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
NATURAL RESOURCES										
Soils	Direct, short- term negligible adverse effects during construction; Indirect, long- term, major beneficial effects due soil stabilization provided by reestablishment native plant communities and control of non- native species	Direct, short- term negligible adverse effects during construction; Indirect, long- term, major beneficial effects due soil stabilization provided by reestablishment native plant communities and control of non- native species	Direct, short- term moderate adverse effects during construction; Indirect, long- term, moderate beneficial effects due soil stabilization provided by restoration of native plant communities	Direct, short- term moderate adverse effects during construction; Indirect, long- term, minor, adverse resulting from net increase in runoff	Direct, short- term moderate, adverse effects during construction; Indirect, long- term, moderate, beneficial effects due soil stabilization provided by restoration of native plant communities	Direct, short- term moderate, adverse effects during construction; Indirect, long- term, moderate, beneficial effects due soil stabilization provided by restoration of native plant communities	Direct, short- term major adverse effects during construction; Indirect, long- term, moderate adverse effects due to increased impervious surfaces, runoff, and pedestrian and vehicular traffic	Direct, short- term major adverse effects during construction; Indirect, long- term, moderate adverse effects due to increased impervious surfaces, runoff, and pedestrian and vehicular traffic	Direct, short- term moderate adverse effects during construction; Indirect, long- term, moderate adverse effects due to increased impervious surfaces, runoff, and pedestrian and vehicular traffic	Direct, short- term moderate adverse effects during construction; Indirect, long- term, moderate adverse effects due to increased impervious surfaces, runoff, and pedestrian and vehicular traffic
Terrestrial Communities	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery; Indirect, long- term, major beneficial effects due to potential for expansion of montane alluvial forest and wildlife habitat	Direct, short- term, minor adverse effects during construction due to use of heavy machinery; Indirect, long- term, major beneficial effects due to potential for expansion of montane alluvial forest and wildlife habitat	Direct, short- term, negligible, adverse effects during construction due to use of heavy machinery; Indirect, long- term, major beneficial effects due to potential for expansion of montane alluvial forest and wildlife habitat; long- term, minor, adverse effect due to increased hazard tree management	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery; Indirect, long- term, major beneficial effects due to potential for expansion of montane alluvial forest and wildlife habitat; long- term, minor, adverse effect due to increased hazard tree management	Direct, short- term, moderate, adverse effects during construction due to soil disturbance; Indirect, long- term, negligible benefit due to potential for expansion of forest communities over; long- term, moderate, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat	Direct, short- term, moderate, adverse effects during construction due to soil disturbance; Indirect, long- term, negligible benefit due to potential for expansion of forest communities; long- term, moderate, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat	Direct, short- term, moderate adverse effects during construction due to soil disturbance; Indirect, long- term, minor, adverse effects due to loss of forest communities; potential for chronic disturbance increased due to proposed lodging; long- term, major, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat	Direct, short- term, moderate adverse effects during construction due to soil disturbance; Indirect, long- term, minor, adverse effects due to loss of forest communities; potential for chronic disturbance increased due to proposed lodging; long- term, major, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat	Direct, short- term, moderate adverse effects during construction due to soil disturbance; Indirect, long- term, minor, adverse effects due to loss of forest communities; potential for chronic disturbance increased due to proposed lodging; long- term, major, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat	Direct, short- term, moderate adverse effects during construction due to soil disturbance; Indirect, long- term, minor, adverse effects due to loss of forest communities; potential for chronic disturbance increased due to proposed lodging; long- term, major, adverse effect due to increased hazard tree management and other activities in montane alluvial forest habitat
Aquatic Communities	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, long- term, minor beneficial effects due to increase in soil stabilization and reduced erosion potential	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, long- term, minor beneficial effects due to increase in soil stabilization and reduced erosion potential	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, long- term, minor beneficial effects due to increase in soil stabilization and reduced erosion potential	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, long- term, minor beneficial effects due to increase in soil stabilization and reduced erosion potential	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.	Direct, short- term, negligible adverse effects during construction due to use of heavy machinery and increased erosion potential; Indirect, minor, long- term, and adverse from increase in impermeable surfaces and runoff into surface waters and potential for deposition of petrochemicals into adjacent waterways.

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Table 4- 13: (continued)

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
NATURAL RESOURCES										
Wetland Communities and Functional Values	Direct, short- term minor adverse effects during construction; long- term, indirect, moderate beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; long- term, indirect, moderate beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; long- term, indirect, minor beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; long- term, indirect, moderate beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; long- term, indirect, minor beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; long- term, indirect, minor beneficial effects due to removal of buildings adjacent to wetlands; Flood storage, fish and shellfish habitat, recreation, wildlife habitat, aesthetics/visual quality functions would benefit	Direct, short- term minor adverse effects during construction; Indirect, short- term negligible adverse effects during construction; long- term, indirect minor, adverse effects due to retention of buildings and paving of parking areas adjacent to wetlands.	Direct, short- term minor adverse effects during construction; Indirect, short- term negligible adverse effects during construction; long- term, indirect minor, adverse effects due to retention of buildings and paving of parking areas adjacent to wetlands.	Direct, short- term minor adverse effects during construction; Indirect, short- term negligible adverse effects during construction; long- term, indirect minor, adverse effects due to retention of buildings and paving of parking areas adjacent to wetlands.	Direct, short- term minor adverse effects during construction; Indirect, short- term negligible adverse effects during construction; long- term, indirect minor, adverse effects due to retention of buildings and paving of parking areas adjacent to wetlands.
Threatened, Endangered, Sensitive and Rare Species	Federal- listed species: No direct effect; State- listed species: Direct, short term, adverse effects during construction; Indirect long- term minor benefits due to expansion of chamomile grapefern, butternut and Fraser's sedge habitat	Federal- listed species: No direct effect; State- listed species: Direct, short term, adverse effects during construction; Indirect long- term minor benefits due to expansion of chamomile grapefern, butternut and Fraser's sedge habitat	Federal- listed species: No direct effect; State- listed species: Direct, short term, adverse effects during construction; Indirect long- term minor benefits due to expansion of chamomile grapefern, butternut and Fraser's sedge habitat	Federal- listed species: No direct effect; State- listed species: Direct, short term, adverse effects during construction; Indirect long- term minor benefits due to expansion of chamomile grapefern, butternut and Fraser's sedge habitat	Federal- listed species: No direct effect; Long- term, indirect negligible benefits due to expansion of potential habitat State- listed species: (chamomile grapefern, butternut and Fraser's sedge)	Federal- listed species: No direct effect; Long- term, indirect negligible benefits due to expansion of potential habitat State- listed species: (chamomile grapefern, butternut and Fraser's sedge)	Federal- listed species: No effect; State- listed species: Long- term, indirect moderate, adverse due to increased visitation, pedestrian and vehicular traffic and potential for chronic disturbance to existing plant communities.	Federal- listed species: No effect; State- listed species: Long- term, indirect moderate, adverse due to increased visitation, pedestrian and vehicular traffic and potential for chronic disturbance to existing plant communities.	Federal- listed species: No effect; State- listed species: Long- term, indirect moderate, adverse due to increased visitation, pedestrian and vehicular traffic and potential for chronic disturbance to existing plant communities.	Federal- listed species: No effect; State- listed species: Long- term, indirect moderate, adverse due to increased visitation, pedestrian and vehicular traffic and potential for chronic disturbance to existing plant communities.
Water Quality	Direct, short- term, negligible adverse effects due to increased potential for runoff and sedimentation during construction; Indirect, long- term minor beneficial effects from increased area available for infiltration (2.41 acres)	Direct, short- term, minor, adverse effects due to increased potential for runoff and sedimentation during construction; Indirect, long- term minor beneficial effects from increased area available for infiltration (2.41 acres)	Direct, short- term, negligible, adverse effects due to increased potential for runoff and sedimentation during construction; Indirect, long- term minor beneficial effects from increased area available for infiltration (2.04 acres)	Direct, short- term, negligible, adverse effects due to increased potential for runoff and sedimentation during construction; Indirect, long- term minor beneficial effects from increased area available for infiltration (1.88 acres)	Short- term, negligible adverse effects due to increased potential for runoff and sedimentation during construction; Long- term minor beneficial effects from increased area available for infiltration (1.64 acres)	Short- term, negligible adverse effects due to increased potential for runoff and sedimentation during construction; Long- term negligible beneficial effects from increased area available for infiltration (1.17 acres), due to overall net increase in impervious surfaces	Short- term, minor, adverse effects due to increased potential for runoff and sedimentation during construction; Long- term minor adverse effects resulting from increased impervious surfaces, net loss of area available for infiltration and associated runoff	Short- term, minor, adverse effects due to increased potential for runoff and sedimentation during construction; Long- term minor adverse effects resulting from increased impervious surfaces, net loss of area available for infiltration and associated runoff	Short- term, minor, adverse effects due to increased potential for runoff and sedimentation during construction; Long- term minor adverse effects resulting from increased impervious surfaces, net loss of area available for infiltration and associated runoff	Short- term, minor, adverse effects due to increased potential for runoff and sedimentation during construction; Long- term minor adverse effects resulting from increased impervious surfaces, net loss of area available for infiltration and associated runoff

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Table 4- 13: (continued)

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
NATURAL RESOURCES (continued)										
Floodplains	No direct effects; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	No direct effects; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	No direct effects; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	No direct effects; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	No direct effects; Indirect, short- term negligible adverse effects during construction; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	No direct effects; Indirect, short- term negligible adverse effects during construction; permanent, indirect, moderate beneficial effects due to removal of buildings from floodplain	Direct, short- term minor, adverse effects during construction; indirect, permanent, minor adverse effects due to retention of buildings within and adjacent to floodplain	Direct, short- term minor, adverse effects during construction; indirect, permanent, minor adverse effects due to retention of buildings within and adjacent to floodplain	Direct, short- term minor, adverse effects during construction; indirect, permanent, moderate, adverse effects due to retention of buildings within and adjacent to floodplain	Direct, short- term minor, adverse effects during construction; Indirect, permanent, moderate, adverse effects due to retention of buildings within and adjacent to floodplain
Air Quality	Direct, short- term, negligible, adverse effect during construction; no long- term direct or indirect effects NOx = 50.37 tons/yr VOCs=72.64 tons/yr	Direct, short- term, negligible, adverse effect during construction; no long- term direct or indirect effects NOx = 50.37 tons/yr VOCs=72.64 tons/yr	Direct, short- term, negligible, adverse effect during construction; no long- term direct or indirect effects NOx = 50.37 tons/yr VOCs=72.64 tons/yr	Direct, short- term, negligible, adverse effect during construction; no long- term direct or indirect effects NOx = 50.37 tons/yr VOCs=72.64 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , minor, adverse effect NOx = 53.29 tons/yr VOCs=76.65 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , minor, adverse effect NOx = 53.29 tons/yr VOCs=76.65 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , moderate, adverse effect NOx = 56.94 tons/yr VOCs=82.13 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , moderate, adverse effect NOx = 56.94 tons/yr VOCs=82.13 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , major, adverse effect NOx = 58.40 tons/yr VOCs=83.95 tons/yr	Direct, short- term, negligible, adverse effect during construction; long- term, indirect , major, adverse effect NOx = 56.94 tons/yr VOCs=82.13 tons/yr
INTERPRETATION AND VISITOR USE										
Visitor Experience and Visitor Facilities	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major benefits due to building removal and increased safety	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major benefits due to building removal and increased safety	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, minor to moderate benefits due to building removal, increased safety, and additional interpretive features	Direct, short- term, adverse effects during construction; Indirect, long- term, moderate benefits due to increased safety, and additional interpretive features	Direct, long- term, major, beneficial major benefits due to increased visitor safety and addition of interpretive features	Direct, long- term, major, beneficial major benefits due to increased visitor safety and addition of interpretive features	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major adverse effects on visitor experience due to considerable increase in visitation; Indirect, long- term, major benefits due to addition of a variety of visitor facilities	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major adverse effects on visitor experience due to considerable increase in visitation; Indirect, long- term, major benefits due to addition of a variety of visitor facilities	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major adverse effects on visitor experience due to considerable increase in visitation; Indirect, long- term, major benefits due to addition of a variety of visitor facilities	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major adverse effects on visitor experience due to considerable increase in visitation; Indirect, long- term, major benefits due to addition of a variety of visitor facilities

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Table 4- 13: (continued)

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
SOCIOECONOMIC ENVIRONMENT										
Land Use	No direct effects; indirect, long- term, minor, beneficial effects due to opening grounds	No direct effects; indirect, long- term, minor, beneficial effects due to opening grounds	No direct effects; indirect, long- term, moderate, beneficial effects due to opening grounds and increased interpretive opportunities	No direct effects; indirect, long- term, moderate, beneficial effects due to opening grounds and increased interpretive opportunities	No direct effects; indirect, long- term, moderate, beneficial effects due to opening grounds and increased interpretive opportunities and visiting scientist housing	No direct effects; indirect, long- term, moderate, beneficial effects due to opening grounds and increased interpretive opportunities, curatorial facility, and visiting scientist housing	No direct effects; indirect, long- term, moderate, adverse effects due to crowding and traffic congestion caused by increased visitation to interpretive exhibits, lodging cabins and visiting scientist housing	No direct effects; indirect, long- term, moderate, adverse effects due to crowding and traffic congestion caused by increased visitation to interpretive exhibits, lodging cabins, Hotel and Annex and visiting scientist housing	No direct effects; indirect, long- term, moderate, adverse effects due to crowding and traffic congestion caused by increased visitation to interpretive exhibits, and lodging cabins	No direct effects; indirect, long- term, moderate, adverse effects due to crowding and traffic congestion caused by increased visitation to interpretive exhibits, lodging cabins, Hotel and Annex
Access and Circulation	Direct, short- term negligible adverse effects during construction; No long- term effects.	Direct, short- term negligible adverse effects during construction; No long- term effects.	Direct, short- term negligible adverse effects during construction; Indirect, long- term moderate benefits due to repair of damaged roadways and walkways	Direct, short- term negligible adverse effects during construction; Indirect, long- term moderate benefits due to repair of damaged roadways	Direct, short- term minor adverse effects during construction; Indirect, long- term moderately adverse due to considerable increase in traffic and associated increase in operation and maintenance costs	Direct, short- term minor adverse effects during construction; Indirect, long- term moderately adverse due to considerable increase in traffic and associated increase in operation and maintenance costs	Direct, short- term minor adverse effects during construction; Indirect, long- term major adverse due to considerable increase in traffic, need for pedestrian safety measures and associated increase in operation and maintenance costs	Direct, short- term minor adverse effects during construction; Indirect, long- term major adverse due to considerable increase in traffic, need for pedestrian safety measures and associated increase in operation and maintenance costs	Direct, short- term minor adverse effects during construction; Indirect, long- term major adverse due to considerable increase in traffic, need for pedestrian safety measures and associated increase in operation and maintenance costs	Direct, short- term minor adverse effects during construction; Indirect, long- term major adverse due to considerable increase in traffic, need for pedestrian safety measures and associated increase in operation and maintenance costs
VIEWSHED	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major benefits due to removal of buildings and structures; indirect long- term, minor, adverse effects due to retention of cultural landscape components	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major benefits due to removal of buildings, structures, and cultural landscape components	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, minor, adverse effects due to retention of buildings, structures and cultural landscape components; indirect, long- term, minor benefits due to removal of buildings in most areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, minor, adverse effects due to retention of buildings, structures and cultural landscape components; indirect, long- term, minor benefits due to removal of buildings in most areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, moderate, adverse effects due to retention of buildings, structures and cultural landscape components; indirect, long- term, minor benefits due to removal of buildings in some areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, moderate, adverse effects due to retention of buildings, structures and cultural landscape components (and reconstructed Wonderland Hotel and restored / rehabilitated Annex); indirect, long- term, minor benefits due to removal of buildings in some areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major, adverse effects due to retention of buildings, structures and cultural landscape components; indirect, long- term, negligible benefits due to removal of buildings in some areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major, adverse effects due to retention of buildings, structures and cultural landscape components (and reconstructed Wonderland Hotel and restored / rehabilitated Annex); indirect, long- term, negligible benefits due to removal of some buildings	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major, adverse effects due to retention of most buildings, structures and cultural landscape components; indirect, long- term, negligible benefits due to removal of buildings in some areas of the District	Direct, short- term, negligible adverse effects during construction; Indirect, long- term, major, adverse effects due to retention of buildings, structures and cultural landscape components (and reconstructed Wonderland Hotel and restored / rehabilitated Annex); indirect, long- term, negligible benefits due to removal of some buildings

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Table 4- 13: (continued)

RESOURCE	ALTERNATIVE									
	No Action	A	B	C	D1	D2	E1	E2	F1	F2
SOUNDSCAPE	Direct, short- term, minor, adverse effect during construction; no long- term effects 35–60 dBA average 60 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 35–60 dBA average 60 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 60 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 60 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum	Direct, short- term, minor, adverse effect during construction; no long- term effects 50–60 dBA average 70 dBA maximum
NPS OPERATIONS	No direct effects: Indirect, permanent major benefits due to elimination of need to maintain historic buildings	No direct effects: Indirect, permanent major benefits due to elimination of need to maintain historic buildings	No direct effects: Indirect, permanent moderate benefits due to elimination of maintenance needs for some historic buildings; long- term, minor, adverse effects due to increased need for vegetation management	No direct effects: Indirect, permanent moderate benefits due to elimination of maintenance needs for some historic buildings; long- term, minor, adverse effects due to increased need for vegetation management	No direct effects: Indirect, permanent moderate benefits due to elimination of maintenance needs for some historic buildings; long- term, moderate, adverse effects due to increased need for vegetation management	Indirect, permanent, major adverse effects due to additional cost associated with law enforcement, maintenance of buildings retained, including visiting scientist temporary housing and maintenance and staffing of curatorial storage facility; long- term, moderate, adverse effects due to increased need for vegetation management	Indirect, permanent, major adverse effects due to additional cost associated with law enforcement, maintenance, visiting scientist temporary housing and management of concessions contract; long- term, moderate, adverse effects due to increased need for vegetation management	Indirect, permanent, major adverse effects due to additional cost associated with law enforcement, maintenance, visiting scientist temporary housing and management of concessions contract; long- term, moderate, adverse effects due to increased need for vegetation management	Indirect, permanent, major adverse effects due to additional cost associated with law enforcement, maintenance, and management of concessions contract; long- term, moderate, adverse effects due to increased need for vegetation management	Indirect, permanent, major adverse effects due to additional cost associated with law enforcement, maintenance, and management of concessions contract; long- term, moderate, adverse effects due to increased need for vegetation management

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4.10 Compliance with Federal and State Laws, Executive Orders, and Regulations

Compliance with federal and state laws, Executive Orders and regulations, as well as NPS policies is described in detail in Section 2.1 of this document. This section provides an overview of the alternatives development process, methods to comply with NEPA and the NHPA and the public participation process that is integral to the processes defined by these laws. In addition to federal legislation, compliance with a variety of Director's Orders is discussed as well.

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Accipiter striatus (sharp shinned hawk): http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=106313&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=106313&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=106313&selectedIndexes=102890&selectedIndexes=100157&menuselectfooter=none

Cardamine flagellifera (running bittercress):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=PDBRAoKoEo&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=PDBRAoKoEo&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=PDBRAoKoEo&menuselectfooter=none

Carpiodes velifer (highfin carpsucker):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=106190&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=106190&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=106190&menuselectfooter=none

Contopus cooperi (olive sided flycatcher)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102228&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102228&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102228&menuselectfooter=none

Corvus corax (common raven):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=ABPAV10110&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=ABPAV10110&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=ABPAV10110&menuselectfooter=none

Cycleptus elongatus (blue sucker):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=AFCJC04010&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=AFCJC04010&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=AFCJC04010&menuselectfooter=none

Desmognathus wrighti (pigmy salamander)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102489&pagin

g=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102489&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102489&menuselectfooter=none

Falco peregrinus (peregrine falcon):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=ABNKD06070&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=ABNKD06070&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=ABNKD06070&selectedIndexes=ABNKD06071&selectedIndexes=ABNKD06073&selectedIndexes=ABNKD06074&menuselectfooter=none

Geum radiatum (spreading avens):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=PDROSoSoCo&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=PDROSoSoCo&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=PDROSoSoCo&menuselectfooter=none

Haliaeetus leucocephalus (bald eagle)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=104470&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=104470&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=104470&selectedIndexes=106134&menuselectfooter=none

Hymenophyllum tayloriae (gorge filmy fern)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=132153&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=132153&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=132153&menuselectfooter=none

Limnothlypis swainsonii (Swainson's warbler)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=103514&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=103514&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=103514&menuselectfooter=none

Lysimachia fraseri (Fraser loosestrife)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=154093&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=154093&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=154093&menuselectfooter=none

*Microhexura montivaga (s*pruce- fir moss spider):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=ILARA33010&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=ILARA33010&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=ILARA33010&menuselectfooter=none

Myotis sodalis (Indiana bat):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=AMACC01100&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=AMACC01100&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=AMACC01100&menuselectfooter=none

Percina aurantiaca (tangerine darter)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=100432&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=100432&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=100432&menuselectfooter=none

Percina macrocephala (longhead darter):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=AFCQC04120&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=AFCQC04120&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=AFCQC04120&menuselectfooter=none

Phoxinus tennesseensis (Tennessee dace)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedRepo

rt=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=105508&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=105508&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=105508&menuselectfooter=none

Pituophis melanoleucus melanoleucus (northern pine snake):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=ARADB26012&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=ARADB26010&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=ARADB26010&selectedIndexes=ARADB26011&selectedIndexes=ARADB26012&selectedIndexes=ARADB26013&menuselectfooter=none

Plethobasus cooperianus (orange- footed pearly mussel):
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=IMBIV34020&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=IMBIV34020&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=IMBIV34020&menuselectfooter=none

Sphyrapicus varius (Yellow bellied sapsucker)
http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102671&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102671&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102671&menuselectfooter=none

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http://www.natureserve.org/explorer/servlet/NatureServe?menuselect=none&sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=130567&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=152828&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=152828&selectedIndexes=130221&selectedIndexes=133668&selectedIndexes=146935&selectedIndexes=157067&selectedIndexes=145970&selectedIndexes=154829&selectedIndexes=156523&selectedIndexes=132177&selectedIndexes=146565&selectedIndexes=157840&selectedIndexes=131939&selectedIndexes=129282&selectedIndexes=154775&selectedIndexes=140942&selectedIndexes=155424

&selectedIndexes=147162&selectedIndexes=146556&selectedIndexes=130567&selectedIndexes=156367&menuselectfooter=none

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Northern flying squirrel fact sheet: http://www.ncsparks.net/nhp/guide/7.pdf
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LIST OF ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
APE	area of potential effect
ARPA	Archaeological Resources Protection Act
ASMIS	Archaeological Sites Management Information System
BOD	biological oxygen demand
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
cmbs	centimeters below surface
dbh	diameter at breast height
DOI	Department of the Interior
DEIS	Draft Environmental Impact Statement
District	Elkmont Historic District
EA	Environmental Assessment
EF	emission factor
EPA	Environmental Protection Agency
EPC	Elkmont Preservation Committee
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Maps
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
ft	feet
ft^3	cubic feet
gpd	gallons per day
HBN	Hydrologic Benchmark Data Network
HI	human influence
I/I	inflow and infiltration
km	kilometers
lf	lineal feet
LOS	level of service
m	meters
m^3	cubic meters
mi	miles
MAL	montane alluvial forest
NAC	noise abatement criteria
NADP	National Atmosphere Deposition Program
NIS	non- indigenous species
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
O & M	operation and maintenance

ONRW	Outstanding National Resource Waters
Park	Great Smoky Mountains National Park
ppb	parts per billion
ptsf	percent time spent following
ROD	Record of Decision
RV	recreational vehicle
s	seconds
SCES	Sevier County Electric System
SEAC	Southeast Archeological Center
SHPO	State Historic Preservation Officer
T & E	threatened and endangered
TDEC	Tennessee Department of Environmental Conservation
TDOA	Tennessee Division of Archaeology
THC	Tennessee Historical Commission
TN	Tennessee
TNC	The Nature Conservancy
TNM	traffic noise model
tpd	tons per day
TWRA	Tennessee Wildlife Resources Agency
USDI	United States Department of the Interior
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VMT	number of vehicles times distance
vph	vehicles per hour
VWM	volume- weighted mean
WPC	Water Pollution Control (Division of TDEC)
YOY	young- of- year

GLOSSARY

Adverse (Section 106 usage): alteration, either direct or indirect, to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Affected environment: a description of the existing environment to be affected by the proposed action (40 CFR 1502.15).

Alternative: a reasonable method of addressing the problem identified or satisfying the stated need (40 CFR 1502.4).

Best Management Practices: practices developed by the State of Tennessee (and all other states) to meet the objectives of the Clean Water Act. These objectives include "to restore and maintain the chemical, physical and biological integrity of the Nation's waters". The State has developed practical non- regulatory guidelines to minimize the impact of land management activities on the environment. The guidelines provide practical methods to use in the field to eliminate or minimize the potential for sedimentation, contamination, and eutrophication (nutrient loading) of surface waters.

Building: a house, barn, hotel, or similar construction, created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a house and garage.

Contributing: refers to a resource that adds to the historic associations, historic architectural qualities, or archeological values for which a property is significant because 1) it was present during the period of significance, relates to the documented significance of the property, and possesses historic integrity or is capable of yielding important information about the period; or 2) it independently meets the National Register criteria.

Council on Environmental Quality (CEQ): established under Title II of NEPA to develop Federal agency- wide policy and regulations for implementing the procedural provisions of NEPA, resolve interagency disagreements concerning proposed major Federal actions, and to ensure that Federal agency programs and procedures are in compliance with NEPA.

Cultural landscape: a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cumulative effect: the incremental environmental impact or effect of the proposed action, together with impacts of past, present and reasonably foreseeable future actions, regardless of what agency (Federal or non- Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

District: a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Effect (Section 106 usage): alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places.

Environmental consequences: environmental effects of project alternatives, including the proposed action, any adverse environmental effects which cannot be avoided, the relationship between short- term uses of the human environment, and any irreversible or irretrievable commitments of resources that would be involved if the proposal should be implemented (40 CFR 1502.16).

Environmental Impact Statement (EIS): a detailed written statement required by section 102(2)(C) of NEPA, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short- term uses of the environment versus the maintenance and enhancement of long- term productivity, and any irreversible or irretrievable commitment of resources (40 CFR 1508.1).

Environmental Assessment (EA): a concise public document, prepared in compliance with NEPA, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

Finding of No Significant Impact (FONSI): a document prepared in compliance with NEPA, supported by an environmental assessment, that analyzes whether a Federal action will have no significant impact on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).

Historic: refers to a resource that is 50 years of age or older.

Impact (Effect): a direct result of an action which occurs at the same time and place; or an indirect result of an action which occurs later in time or in a different place and is reasonably foreseeable; or the cumulative results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.8).

Information potential (archeology): the ability to provide data relevant to one or more important research questions.

Integrity (archeology): the presence of artifacts and deposits in their original (or slightly modified) depositional context.

Locus/loci (archeology): a distinct area(s) within an archeological site in Elkmont Historic District that has been surveyed and found to contain cultural deposits relating to one or more prehistoric American Indian or historic period occupations.

Mitigation: planning actions taken to avoid an impact altogether, to minimize the degree or magnitude of the impact, reduce the impact over time, rectify the impact, or compensate for the impact (40 CFR 1508.20).

National Register of Historic Places: the official Federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture.

Noncontributing: refers to a resource that does not add to the historic architectural qualities, historic associations, or archeological values for which a property is significant because 1) it was not present during the period of significance or does not relate to the documented significance of the property; 2) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity or is capable of yielding important information about the period; or 3) it does not independently meet the National Register criteria.

Notice of Intent: a notice that an environmental impact statement will be prepared and considered (40 CFR 1508.22).

Preservation: the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction.

Reconstruction: the act or process of depicting, by means of new construction, the form, features, and detailing of a non- surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Record of Decision (ROD): a concise public record of decision prepared by the Federal agency, pursuant to NEPA that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferred alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and, if not, why they were not), and a summary of monitoring and enforcement for any mitigation (40 CFR 1505.2).

Regeneration; Natural regeneration: a natural supplement to active restoration; plant growth originating from seeds in the soil seed bank within disturbed sites and also from adjacent native seed sources.

Rehabilitation (cultural resources): the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

Restoration (cultural resources): the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.

Restoration (vegetation): the active planting of native plants in an effort to reestablish the closest semblance of the original plant communities.

Revegetation: any type of planting regardless of the species origin (could include plants not native to the immediate area or nonnative species). Revegetation of this type will not be conducted in Elkmont Historic District.

Section 106: Refers to Section 106 of the National Historic Preservation Act of 1966, which requires federal agencies to take into account the effects of their proposed undertakings on properties included or eligible for inclusion in the National Register of Historic Places and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

Site (archeology): in Elkmont Historic District, a section that has been defined for management concerns, and which is bounded by topographic or cultural features. Each site may contain a number of distinct archeological loci.

Structure: to distinguish from buildings, this term is used for those functional constructions made usually for purposes other than creating human shelter. Examples of structures include bridges, dams and gazebos.

Tiering: the coverage of general matters in broader environmental impact statements with subsequent narrower statements of environmental analysis, incorporating by reference, the general discussions and concentrating on specific issues (40 CFR 1508.28).

Unsurveyed area (archeology): a part of the Elkmont Historic District that has not been systematically surveyed for archeological resources.