

AFFECTED ENVIRONMENT / ENVIRONMENTAL CONSEQUENCES

This section describes the affected environment and environmental consequences associated with the alternatives. It is organized by impact topic, which distills the issues and concerns into distinct topics for discussion analysis. These topics focus on the presentation of the affected environment and environmental consequences and allow a standardized comparison between alternatives based on the most relevant topics.

METHODOLOGY

NEPA requires consideration of context, intensity and duration of impacts, direct or indirect impacts, cumulative impacts and measures to mitigate for impacts. NPS policy also requires that “impairment” of resources be evaluated in all environmental documents.

Overall, the NPS based the following impact analyses and conclusions on the review of existing literature and Blue Ridge Parkway studies, information provided by experts within the NPS and other agencies, professional judgments, park staff insights and public input.

General Impact Definitions

Potential impacts are described in terms of type (beneficial or adverse), context, duration, intensity and impairment. The following general definitions were used to evaluate the context, intensity, duration and cumulative nature of impacts associated with project alternatives. Impairment is discussed below. The specific criteria used to rate the intensity and duration of potential impacts for each resource topic are presented within each resource area impact analysis in this chapter.

Context of Impact

Context is the setting within which an impact is analyzed, such as local, park-wide, or regional. CEQ requires that impact analysis include discussions of context. Localized impacts are those that affect the resource area only on the project site or its immediate surroundings, and would not extend park-wide or into the region.

Intensity of Impact

Impact intensity is the degree to which a resource would be beneficially or adversely affected by an action. Impact intensities are quantified as negligible, minor, moderate, or major. Resource-specific criteria used to rate the intensity of project impacts are presented within each resource area impact analysis.

Duration of Impact

The duration of impact is analyzed independently for each resource because impact duration is dependent on the resource being analyzed. Depending on the resource, impacts may last as long as construction takes place, or a single year or growing season, or longer. For purposes of analysis, impact duration is measured in short-term and long-term. Resource-specific criteria used to rate the anticipated duration of resource impacts are presented within each resource area impact analysis.

Cumulative Impacts

CEQ regulations (40 CFR 1508.7) require the assessment of cumulative impacts in the decision-making process for Federal projects. A cumulative impact is an impact on the environment that results from the

incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal), organization, or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts are considered for all alternatives and are presented at the end of each impact topic discussion analysis. To determine potential cumulative impacts, projects in the vicinity of the proposed project site were identified. Potential projects identified as cumulative actions included any planning or development activity that was currently being implemented or that would be implemented in the reasonably foreseeable future.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts of each alternative to determine if they would have any additive effects on natural resources, cultural resources, or visitor use. Known past, current and reasonably foreseeable future projects and actions in the vicinity of the project area are described below.

The Roanoke Valley Conceptual Greenway Plan (RVCGP)

The Roanoke Valley Conceptual Greenway Plan provides the framework for developing an interconnected network of trails and greenway corridors throughout the Roanoke region, has identified 35 specific greenway segments, radiating outward from the urban core of Roanoke, Salem, and Vinton, Virginia (refer to **Figure 2**). In order to realize the Roanoke Greenway vision, the Commission works continuously to explore potential trail linkages, as well as potential new partnerships to complete these segments. Over the past few years attention has been given to the areas south and east of the urban core. In this part of the region, the urban area abuts the Blue Ridge Mountains. Located on the ridge crest is the Blue Ridge Parkway, which is one of the 35 routes in the plan.

Impairment of Park Resources

In addition to determining the environmental consequences of the proposed action and other alternatives, the NPS *Management Policies 2006* and DO-12 require analysis of potential effects to determine if actions would impair a park's resources.

The National Park Service may not allow the impairment of park resources and values unless directly and specifically provided for by legislation or by the proclamation establishing the park. Impairment that is prohibited by the National Park Service Organic Act, the General Authorities Act, and National Park Service *Management Policies, 2006*, is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values had the impact not occurred.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. In this section, a determination on impairment is made in the conclusion statement of each resource area for each alternative. The NPS does not analyze the potential for impairment of recreational values/visitor experience (unless impacts are resource based), socioeconomic values, or park operations.

SOILS AND GEOLOGY

Affected Environment

It is estimated that more than 100 different soil types occur within Parkway administered lands due in part from its location within complex morphology of the Blue Ridge Province and the long-term exposure of geological features to weathering.

Information on soils is based on recent Natural Resource and Conservation Service soils surveys and on previous projects conducted within the same area. The impact analysis examines the potential changes to soils that may occur as a result of project implementation.

Methodology

The thresholds of change for the intensity of an impact on soils are defined as follows:

Negligible

Soils would not be affected or the effects on soils would not be detectable or at the lower levels of detection. Any effects to soils would be slight and would return to normal shortly after completion of project activities.

Minor

The effects on soils would be detectable, but effects on soil productivity, fertility, or area would be small or localized. There could be some slight physical disturbance or removal of soils and/or some compaction. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and would likely be successful.

Moderate

The effect on soil would be readily detectable and result in a change to the soil character over a relatively wide area. Measurable effects could include physical disturbance and removal of large amounts of soil, compaction and unnatural erosion of soils. Mitigation measures would be necessary to offset adverse effects and would likely be successful.

Major

The effect on soil would be readily detectable and substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

The thresholds of change for the duration of an impact on soils are defined as follows:

Short-term: Recovers in less than three years.

Long-term: Takes more than three years to recover.

Impacts of Alternative A – No Action

Under the No Action Alternative, pedestrian and horse use would continue on all existing trails (17.4 miles) and no additional pedestrian or horse trails would be constructed. Presently, little park staff time or money can be devoted to maintenance of trails and trail tread is approaching severe deterioration in several locations. Existing trail tread would continue to degrade without adequate maintenance of trails.

Currently, the trails through the Roanoke corridor are unsurfaced, and there are a number of problems with soil compaction, erosion, and muddiness. Soil compaction of unsurfaced trails reduces water infiltration rates, increases roughness and detachment of surface soil particles, and increases surface runoff. Soil erosion, considered to be the most severe impact on trails because its effects range from long-lasting to permanent, contributes to nutrient loss, water turbidity, sedimentation, alteration of water runoff and exposes rocks and plant roots, creating rutted and uneven tread surfaces, soil erosion (Hammit and Cole, 1998). Undiverted water that pools up on trails could lead to more erosion and muddiness. Running water accelerates erosion rates beyond normal limits and exposes deeper soil layers. Whittaker (1978) found that loosened soil was more likely to form mud.

Pedestrian use on the trails appears to cause minimal impact to the trail tread of the existing trail. Some trail widening has occurred when the trail becomes muddy. The greatest impact from pedestrian use comes from the creation of a number of unauthorized trails that originate on adjacent lands. More than half of the known unauthorized trails (25+ of the 42 known) appear to have been created by pedestrian use.

Horse traffic, though, appears to cause significant compaction to underlying soil layers. Erosional impacts from horses are significantly higher than pedestrian use and mountain bikes (Cole & Spildie, 1998; DeLuca et al., 1998; Wilson & Seney, 1994). Some of the increased erosion is generated from the wider tread surface required to support horse use. Cook (1978) found that horse hoofs tend to puncture and dig up the soil surface, and exposed and dislodged soil has potential for erosion especially during heavy or extended precipitation events. During visual surveys of the trails for this analysis, deep hoof prints appeared to collect and retain water, creating muddy areas.

Cook (1978) found slope and trail location to affect trail impact. Summer (1980) concluded that parent material, grade of trail and side-slope, soil texture and organic content, rockiness and drainage to be influential factors affecting trail deterioration. Numerous studies correlate trail slopes with soil loss (Weaver and Dale 1978; Bratton et al. 1979; Teschner et al. 1979). Trails with high rock or gravel content are less susceptible to soil erosion (Weaver and Dale 1978). Acting as filters, rock materials hold and bind soil particles. Larger rocks are not as easily moved by water or wind. Small rock and stones tend to slow velocity of water runoff and protect underlying soils (Summer 1980; Summer 1986). Parkway trails have been placed with consideration for slope, soil types, and rockiness. Trails through the Roanoke corridor rarely exceed 8% slopes. Water bars, where properly maintained, appear to be effective and efficient in moving water across trails. However, many water bars are missing and severe erosion is creating gullies in several locations. This severe degradation would not be corrected in a timely manner under this alternative, since few staff and funds would be available to maintain them.

Under this alternative, at least 42 unauthorized trails totaling 4.1 miles would be abandoned and restored to near-natural conditions through scarification and/or plantings. The restoration of unauthorized trails would have a moderate positive impact for the long-term, since most unauthorized trails in the project area are greater than 8%, which is the NPS maximum standard for trail design. Trails greater than 8% become conduits for erosion. Removal of 4.1 miles of unauthorized trail would reduce erosion in the project area.

Cumulative Effects

Soil loss would continue to occur inside and outside the park. The growing urbanization adjacent to the park would continue to expose soil to natural elements and compact them with buildings and other structures. The park's contribution to the overall loss of soils and geological features would be considered negligible to the urban sprawl surrounding it.

Conclusion

Alternative A would reduce the amount of soil exposed by restoring more than 4.1 miles of unauthorized trail. However, little improvement in unacceptable trail tread condition would be addressed under this alternative. Thus, this alternative would exhibit moderate adverse impacts for the long-term. However, implementation of this alternative would not result in an impairment of the Blue Ridge Parkway's soil resources.

Impacts of Alternative B – Expanded Trail System with Connections

Under Alternative B, 3.2 acres of soils would be exposed to create 6.25 miles of new pedestrian and horse use trails. If best management practices were used and pedestrian trails created to NPS standards, then soil erosion would be negligible in the long-term. Compaction would be expected through use, but would be minor to moderate in the long-term. Muddy areas would be corrected through installation of water bars, French drains or other diversion devices, or re-contouring the area to allow natural flow. Thus, muddiness would be minor for the long-term.

Unauthorized trails would be eliminated, reducing erosion potential, or rehabilitated to meet NPS standards and would become part of the total trail system. This would have a moderate, long-term positive impact on soil loss.

Existing pedestrian trails subject to compaction, erosion and muddiness would be maintained to NPS standards by volunteer groups under MOA. Trails would be relocated or surfaced if soil movement and compaction could not be maintained to NPS standards.

In order to manage compaction, erosion and muddiness, existing horse trails would be maintained to NPS standards by horse riding clubs under a MOA. If trails were not properly managed and maintained by volunteer groups, the NPS would consider eliminating horse use.

Though research suggests that mountain biking has no more detrimental impacts to trail tread than pedestrian hiking, some of the proposed connector trails would be constructed and maintained on relatively steep slopes. More frequent inspection of these sites and correction of erosion would be required. Thus impacts would be minor in the long-term.

Cumulative Effects

The cumulative impacts of this alternative would be the same as Alternative A.

Conclusion

Alternative B would provide the best protection of soil and geological features with the introduction of user groups providing trail maintenance on a routine basis, as needs arise. There would be no impairment to soil resources on the Blue Ridge Parkway because the impacts would be negligible to minor for the long-term.

Impacts of Alternative C –Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

Under Alternative C, impacts to soils would be the same as discussed in Alternative B except that 3.5 miles of new mountain biking trails would be constructed adjacent to the Roanoke River Parkway and to connect to the Roanoke Valley Greenway. Thurstan and Reader (2001) found no significant differences in soil impacts between mountain bikers and pedestrians, and Wilson and Seney (1994) found that horses dislodged more sediment on trail surfaces than pedestrians or mountain bikes.

The construction of new trails would use details and trail specifications to accommodate mountain bike use. Construction details would take into consideration soil properties to reduce future rutting and erosion. Mountain bikers could potentially widen the trails or create new trails looking for additional challenges which could be mitigated by education and user self-policing. Since trail maintenance under this alternative would be the responsibility of the user (under a MOA with the County and local user groups), trail degradation would be minimized and eliminated by consistent trail rehabilitation. If trail maintenance were not maintained to NPS standards, the NPS could limit the type of use and/or close or relocate trails.

Cumulative Effects

The cumulative impacts of this alternative would be the same as Alternative A.

Conclusion

As with Alternative B, this alternative would provide the greatest protection of soil and geological features with the introduction of user groups providing trail maintenance on a routine basis, as needs arise. Some additional ground exposure could occur with the introduction of mountain bikes on Roanoke River Parkway trails, but this adverse impact would be minor for the long-term. Thus, adverse impacts from this alternative would be negligible to minor for the long-term and there would be no impairment of the park’s resources or values with respect to soils under Alternative C.

WATER RESOURCES

Affected Environment

The proposed project area through the Roanoke Valley between MP 111 and 124 has eleven (11) tributaries that occur on Parkway administered lands as shown below in **Table 2**:

Table 2. Water Resources Within the Project Area		
Parkway Segment	Water Resources	303D Stream (yes/no)
MP 111-112	5 headwaters to Wolf Creek	No
MP 114	1 tributary of Roanoke River	
MP 115	Roanoke River	Yes, for E .coli and PCB in fish (From Niagara Dam to Back Creek)
MP 117-118	3 tributaries of Back Creek	No
MP 121	1 tributary to Back Creek	No
MP 123-124	1 tributary to Back Creek	No

Of those streams visually inspected in this analysis by park staff, stream water appeared clear but aquatic invertebrates were absent, even in pools. This suggests nutrient deficiencies, though no analysis is currently underway to confirm the absence of invertebrates or to determine the cause. None of these streams appear on the Virginia Commonwealth’s 303D list for degraded streams. Streams are wet-weather streams, often flowing only during raining seasons. No fishing has been observed on the waters on Parkway lands nor would it be expected since streams are perennial.

Methodology

Impact analyses on water resources, including wetlands, were based on recent assessments of the site by park and other NPS staff, previous studies or projects conducted within the same area, and assessment of potential changes in surface water and hydrology caused by trail construction and use.

The thresholds of change for the intensity of an impact on water resources are defined as follows:

Negligible

Impacts would not be detectable. Water quality parameters would be well below all water quality standards for the designated use of the water. No vegetation or wildlife effects associated with altered water quality would be evident. Action would cause no change in wetland area or function. Wetlands would not be affected or effects would be below or at the lower levels of detection. No long-term effects to wetlands would occur and any detectable effects would be considered slight, local, and would likely be short-term.

Minor

Impacts would be measurable, but water quality parameters would be well within all water quality standards for the designated use. State water quality and anti-degradation policy would not be violated. Changes in vegetation or wildlife use and health associated with water quality would be slight but measurable. Action would cause no change in wetland area and function. The action would affect a few individuals of plant or wildlife species within an existing wetland or riparian area. The change would require considerable scientific effort to measure and have barely perceptible consequences to wetland or riparian habitat function. Effects to wetlands would be detectable and relatively small in terms of area and the nature of the change, and would likely be short-term.

Moderate

Changes in water quality would be measurable and readily detectable, but water quality parameters would be within all water quality standards for the designated use. State water quality and anti-degradation policy would not be violated. Changes in vegetation and/or wildlife use and health associated with water quality would be measurable and readily apparent. Mitigation would be necessary to offset adverse effects, and would likely be successful. Action would change an existing wetland area or function, but the impact could be mitigated by the creation of artificial wetlands. The action would have a measurable effect on plant or wildlife species within an existing wetland or riparian area, but all species would remain indefinitely viable within the park. The alternative would result in effects to wetlands that would be readily apparent, including a long-term effect on wetland vegetation. Wetland or floodplain functions would not be affected in the long-term.

Major

Changes in water quality would be readily measurable, and some parameters would periodically be approached, equaled, or exceeded. State water quality regulations and anti-degradation policy may be violated. Changes in vegetation and/or wildlife use and health associated with water quality would be measurable and readily apparent, even to a casual observer. Extensive mitigation measures would be necessary and their success would not be assured. The action would have drastic and permanent consequences for an existing wetland area or function which could not be certainly mitigated. Wetland and riparian species dynamics would be upset, and species would be at risk of extirpation from the park.

Effects to wetlands would be observable over a relatively large area (regional scale) and would be long-term. The character of the wetland would be changed so that the functions typically provided by the wetland would be substantially changed.

The thresholds of change for the duration of an impact on water resources are defined as follows:

Short-term: Following implementation activities, recovery would take less than one year.

Long-term: Following implementation activities, recovery would take greater than one year.

Impacts of Alternative A – No Action

The existing trail in the Roanoke Valley corridor crosses three streams. All water crossings consist of bridges and foot stones that allow for natural flow of water. Some erosion occurs at the stream crossings due to off-trail access to the stream. Because these streams are small and do not always maintain a regular flow of water, the impacts are localized and minor.

Cumulative Effects

Water resource use and degradation would continue to occur inside and outside the park. The metropolitan area of Roanoke would continue to expand, channeling more and more storm water runoff and exposing water resources to more changes. The park's contribution to the overall adverse impact to water resources would be considered negligible to the urbanization that would continue adjacent to National Park Service lands.

Conclusion

Alternative A would do little to reduce erosion into headwaters of Wolf Creek, Roanoke River and Back Creek or to address the loss of vegetation and soils currently occurring through use on those portions of the stream crossed by the trail since few funds are expended to maintain trails to NPS standards. Under this alternative, there would be no impairment of the park's water resources, though there would be minor, direct adverse impacts for the long-term.

Impacts of Alternative B – Expanded Trail System with Connections

The proposed addition of 6.25 miles of pedestrian and horse use trails would cross several stream channels. Many of these crossings are dry except after rains. The water source for many waterways come from Parkway culverts where surface flow from the surrounding area accumulates at one point and channels relatively large volumes of water downstream, sometimes flooding trails. Trails near streams are susceptible to periodic flooding (Root and Knapik 1972) though channels fed by culverts may experience more episodes of high volume water (NPS observation, 2007). Degradation of trails near water is minimized if hardened and adequately drained. When eroded soils enter waterways, the result is increased turbidity and sedimentation impacts water organisms (Fritz 1993). To reduce erosion potential into streams, new trails would be constructed to NPS standards and adequately maintained to minimize degradation.

Streams in the vicinity of Explore Park entrance road and Roanoke River OL may be receiving contaminated effluent from the Roanoke Valley Resource Authority's (RVRA) old landfill. The Parkway is working with RVRA and Virginia Department of Environmental Quality (VADEQ) to monitor the outflow and to mitigate contamination of other water sources.

The proposed 2.4-mile loop trail north of the Roanoke River (MP 113-115) would require at least six crossings. Crossings would be constructed and sized so as not to obstruct natural water flow. Manure runoff could adversely affect water quality (Hammit & Cole 1998). It should be noted that construction of stream crossings would require Section 404 USACE permits and the park would obtain all necessary permits before any construction activities began.

Cumulative Effects

The cumulative impacts of this alternative would be similar to Alternative A.

Conclusion

Alternative B has the greatest potential to minimize degradation of water resources. Under this alternative, trails would be adequately maintained by user groups through a MOA, thus minimizing the amount of erosion that could reach streams and creeks. Thus adverse impacts would be negligible in the long-term. Implementation of Alternative B would not lead to an impairment of water resources on the Blue Ridge Parkway.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

The adverse impact to water resources for this alternative would be the same as Alternative B. The addition of mountain bike use at the Roanoke River Parkway Trails would not appreciably change impacts to water resources.

Cumulative Effects

The adverse cumulative impacts of this alternative would be the same as for Alternatives A and B.

Conclusion

The conclusion for this alternative is the same as for Alternative B. There would be no impairment of the Blue Ridge Parkway's water resources under Alternative C because the impacts would be adverse and negligible in the long-term.

VEGETATION

Affected Environment

The Blue Ridge Parkway is one of the most bio-diverse parks in the National Park Service system, surpassed only by Great Smoky Mountains National Park. Containing 75 distinct plant communities, 24 of which are globally rare, the park boasts a total of 1,614 vascular plants. The flora of the Blue Ridge Parkway is so diverse for reasons such as climatic variability, large north-south geographic range, diverse geologic substrate, and many different micro-habitats.

The project area is located at 1,200 feet ASL and contains a forest canopy of hardwoods, dominated by oaks and mixed with other hardwoods and Virginia pines. A number of exotic plants have invaded the park in this area, including but not limited to *Ailanthus altissima* (Tree of heaven), *Mimosa tomentosa* (mimosa tree), *Pueraria lobata* (kudzu), and *Rosa multiflora* (multiflora rose). Because the project area is at a relatively low elevation compared to the rest of the park and adjacent land development up to the park boundary has introduced exotic plants, native vegetation is being lost. Thus, the project area contains little of the exemplary biodiversity found in other sections of the park and there are no rare plants or rare plant communities within the project area.

Methodology

This impact analysis focuses on vegetation that is considered most likely to be affected by the project. Information on vegetation was derived from observations made in the field, previous projects conducted within the same area, and consultation with park staff. The impact analysis examines the potential

changes to vegetation that may occur as a result of project implementation.

The thresholds of change for the intensity of an impact on vegetation are defined as follows:

Negligible

No rare plant species or uncommon plant communities would be affected. Individual native plants might be affected, but impacts would be localized and of no long-term consequence to the species. The effects would be on a small scale and well within the range of natural fluctuations.

Minor

Effects to native plants would be measurable or perceptible, but would be localized within a small area of the species occurrence within the park. The viability of the plant community would not be affected and the community, if left alone, would recover quickly. Impacts would not be expected to be outside the natural range of variability and would not be expected to have any long-term effects on native species, their habitats, or the natural processes sustaining them.

Moderate

A sizeable number of native plant species within the park over a relatively large area would be affected. Mitigation measures to offset and minimize adverse effects would be necessary and would likely be successful.

Major

Effects on native plant populations within the park would be extensive. Impacts would be expected to be outside the natural range of variability for long periods of time or to be permanent. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

The thresholds of change for the duration of an impact on vegetation are defined as follows:

Short-term: Recovers in less than three years or less.

Long-term: Takes more than three years to recover.

Impacts of Alternative A – No Action

Exotic plants dominate the landscape throughout the Roanoke corridor, and nothing within this proposed action would change the current status. The restoration of 4.1 miles of unauthorized trail would reduce exposed soil and vegetation loss on approximately one acre of land. Exotic plants tend to follow disturbance vectors, such as overhead utility lines, railways, roadways and trails. Thus, there would be minor improvement for the long-term from new exotic plant incursion.

Horses tied to trees could result in damage to bark from chewing and friction of ropes, girdling and killing trees (Cole 1983). Open wounds from bark damage allows for invasion of the inner wood by forest pest and diseases. Compaction, pawing and digging loosens soil and exposes tree roots. The proposed action does not include establishment of hitching posts or stopping areas for horses since there appears to be no areas that are experiencing this type of damage currently. If areas would become degraded, then NPS staff could consider installation of hitching posts to reduce and eliminate damage to trees. Thus, there would be none to negligible impacts from current horse use on trees.

Cumulative Effects

Though existing trails act as vectors along which exotic plants migrate, the entire Roanoke Valley has been invaded and overtaken by exotic plants. Little bio-diversity is left through this section of Parkway,

and though the potential to enter the Parkway would not be reduced, the disturbed ground that allows an exotic to move quickly through an area would be reduced under this option.

Conclusion

Alternative A provides the most protection for the spread of exotic plants since 42 unauthorized trails would be eliminated and restored, reducing the ease with which exotic plants would invade Parkway land. This alternative, then, would allow negligible to minor impact from exotic plants. Under this alternative, there would be no impairment of the park's resources or values with respect to vegetation.

Impacts of Alternative B - Expanded Trail System with Connections

Under this alternative, 6.25 miles of new trail would be constructed. Though 3.7 acres of vegetation would be removed during the initial construction of trails, the habitat through which the new trail would be placed is some of the lowest diversity in the park (e.g., much of the vegetation proposed for removal are exotic species).

The most common impact to vegetation along trails is trampling and compositional changes, and exposed root systems (Hammitt and Cole, 1998, Leung and Marion 1996; Tyser and Worley 1992) and the introduction of exotic plant species. Because the trail would be placed in an area inhabited primarily by exotics, the loss of 3.7 acres of exotic plants from direct construction of the trail would be beneficial and minor for the long-term. There would likely continue to be trampling at the edges of the trail that expose root systems in areas of high activity and near stream crossings where off-trail use is prevalent. However, best management practices to manage and restore areas promptly or to harden areas to accommodate use would be beneficial for the long-term. The loss of vegetation for the increased recreational value would be acceptable to park managers.

Cumulative Effects

The metropolitan area of Roanoke Valley is inundated with exotic plant species. The introduction of 6.25 miles of additional trail would pale in comparison to the movement of exotics throughout the valley. Little bio-diversity is left through this section of Parkway, though new sections of trail may contribute to the incursion of additional acreage to exotic plants.

Conclusion

Under Alternative B, there would be no impairment of the Blue Ridge Parkway's native vegetation resources since direct adverse impacts caused by horse or pedestrian use would be mitigated routinely through use of volunteer labor (volunteer agreements to maintain trails) and the direct loss of exotic vegetation to construction of the trail would be beneficial and minor for the long-term.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

The construction of 3.5 miles of mountain bike trails adjacent to the Roanoke River Parkway would not significantly add to the loss of vegetation for the site which is immature trees, and agricultural fields. Construction could provide the opportunity to reduce evasive species infiltration. Many studies demonstrate that mountain biking does not significantly deteriorate trails any more than pedestrian hiking. Off-trail use by mountain bikes to create a more challenging ride could occur. Degradation generated by off-trail use would be rehabilitated by user groups under an approved Memorandum of Agreement. Thus, impacts of Alternative C would be negligible to minor for the long-term.

Cumulative Effects

The cumulative adverse impacts for this alternative would be the same as Alternative B.

Conclusion

Under Alternative C, the impact of exotics would be minor for the long-term (the same as Alternative B). Treatment of exotic species during construction could reduce the short-term infiltration rate. There would be no impairment of the park's vegetation resources under this alternative.

WILDLIFE

Affected Environment

The Parkway in its entirety possesses 67 species of mammals, 30 species of reptiles, 43 amphibian species (more than any other NPS unit in the system), 93 fish species and 227 species of birds. More than 150 species of birds are known to breed and nest within the park with dozens of others passing through during fall and spring migrations. Wildlife use habitat in the vicinity of the project area for a variety of purposes: shelter, cover and concealment, forage, and nesting/roosting sites. Literature reviews for known wildlife in the project area found 80 bird species, 11 mammals, 13 reptiles and amphibians and 31 common invertebrates, mostly moths, butterflies, and spiders. No rare species occur in the project area.

Methodology

This impact analysis focuses on wildlife and wildlife habitat that are considered most likely to be affected by the project. Information on wildlife habitats and species potentially present was derived from observations made in the field, previous projects conducted within the same area, and consultation with park staff. The impact analysis examines the potential changes to wildlife, habitat and use of the project area that may occur as a result of project implementation.

The thresholds of change for the intensity of an impact on wildlife are defined as follows:

Negligible

Wildlife and their habitats would not be affected or the effects would be below the level of detection. Impacts would be well within the range of natural fluctuations.

Minor

Effects on wildlife or habitats would be detectable, but localized. While the mortality of individual animals might occur, the viability of wildlife populations would not be affected and the community, if left alone, would recover. Impacts would not be expected to be outside the natural range of variability and would not be expected to have any long-term effects on native species, their habitats, or the natural processes sustaining them. Sufficient habitat would remain functional to maintain viability of all species.

Moderate

A change in wildlife populations or habitats would be readily detectable and localized. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of population. Mortality or interference with activities necessary for survival could be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts could be outside the natural range of variability for short periods of time. Sufficient habitat would remain functional to maintain variability of all native wildlife species. Mitigation measures would be necessary to offset adverse effects, and would likely be successful.

Major

Effects on wildlife populations or habitats would be readily detectable, would substantially change wildlife populations over a large area. Impacts would be expected to be outside the natural range of variability for long periods of time or to be permanent. Loss of habitat may affect the viability of at least some native species. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.

The thresholds of change for the duration of an impact on wildlife and habitat are defined as follows:

Short-term: Recovers in less than three years.

Long-term: Takes more than three years to recover.

Impacts of Alternative A – No Action

Linear barriers and human presence on them, such as roads, trails, utility lines and railways can cause a disturbance response in wildlife (Vohman, 2002; Hellmund, 1998; Knight and Cole, 1991). Foreman (1995) determined that some linear features had a positive influence by providing habitat and serving as conduits for travel and escape while others had a negative influence by serving as barriers or sinks that impeded wildlife movement and led to mortality.

There have been a significant number of comprehensive studies conducted to assess the impacts of paved roads, but much less has been written about the impacts of dirt roads and trails on wildlife. There are even fewer studies that directly compare the diverse species-specific impacts that emerge along this spectrum of linear features. Jalkotzy *et al.* (1997) described possible wildlife disturbances within specific categories, including individual disruption, social modification, habitat avoidance, habitat disruption or enhancement, direct or indirect mortality, and population effects, to help assess potential impacts of different types of linear barriers. Kasworm (1990) found that large carnivores tend to avoid trails, with distances of avoidance increasing when it is more heavily used. Overall, the affects of habitat disruption from pedestrian trail use on wildlife is probably minimal (Jalkotzy, et. al. 1997).

There is some evidence that the presence of humans on trails can stress wildlife populations and disrupt their behavior (Vohman 2002) and some indirect mortality could result if trails were used to hunt and poach wildlife.

Davis (2007) found that habitat for salamanders increased adjacent to trails when woody debris (natural cover) is cut into smaller pieces and scattered on either side of the trail. He attributed the increase to the higher level of cover availability, not the proximity to the trail. Throughout the life of the trail, downed and dying trees would be felled and left adjacent to the trail unless an extenuating circumstance were present, such as aesthetics or increased fire fuels being present.

Much of the project area is an “island” of woodland sandwiched between the Parkway motor road and housing and commercial development, serving as a safety corridor for “urban” wildlife. During the survey period, whitetail deer were plentiful, as were a number of forest and grassland birds including several hawks, and a large number of flying invertebrates. Attempts to manage deer populations has occurred on adjacent lands, and coyote and bear are known in the area, so current use of existing trails does not seem to be adversely affecting denning activities or movement patterns.

Cumulative Effects

The Roanoke Valley is crisscrossed with linear barriers that would adversely impact wildlife movement, 8-lane highways, utility corridors, housing developments and commercial developments. The existing 17

miles of Parkway trails would not appreciably change the overall condition of wildlife populations. As a matter of fact, the Parkway provides habitat for escape, foraging, migration and denning of large and small game and non-game species.

Conclusion

Implementation of this alternative would not lead to an impairment of wildlife resource on the Blue Ridge Parkway because impacts to wildlife would be negligible for the long-term.

Impacts of Alternative B – Expanded Trail System with Connections

The construction of additional trails would most adversely impact movement and reduce habitat of small amphibians and reptiles, especially salamanders, since they tend to avoid areas without vegetation and canopy cover. They would adjust their habitat range to avoid the trail but would begin to overlap with another's territory. The territory change would balance itself out over time.

During construction of the trails, any trees that require removal would be felled and left adjacent to the trail, providing good habitat for herpetofauna. During routine maintenance of the trail, dead and dying trees would also be felled and left adjacent to the trail unless the downed wood would increase park fuels loading beyond an acceptable level. Thus, impacts to wildlife would be direct and indirect, minor for the short-term, and negligible to minor in the long-term under Alternative B.

Cumulative Effects

Six and a quarter miles of additional trails would not appreciably impact wildlife species within the Roanoke Valley corridor. Many utility, road and trail corridors exist outside the park that contributes to the overall fragmentation of herpetofauna habitat.

Conclusion

Impacts to wildlife under Alternative B would be negligible for the long-term resulting in no impairment to wildlife resources. Leaving trees along the trail corridor would successfully maximize salamander habitat.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

Overall, the affects of habitat disruption from pedestrian trail use on wildlife is probably minimal (Jalkotzy, *et. al.* 1997).

The addition of mountain bike use along the Roanoke River Parkway could potentially alarm large and small mammals along the trail, especially around blind curves or when quick maneuvers were made. However, wildlife would likely move out of the immediate area and find suitable habitat nearby, or visit the area during times when recreational activity was low. Under Alternative C, park staff estimate minimal to moderate use of the trails by mountain bikers and there would be only negligible to minor changes to wildlife use, movement or denning activities.

Cumulative Effects

Cumulative impacts would be the same as Alternative B.

Conclusion

Impacts to wildlife under this alternative would be negligible to minor for the long-term. Leaving trees along the trail corridor would successfully maximize salamander habitat. Education of mountain bikers

would reduce some excessive displays of challenging maneuvers. Management of the trail system vegetation may include forest and open fields increasing habitat diversity. Duration of these benefits would be long-term and there would be no impairment to wildlife resources on the Blue Ridge Parkway under Alternative C.

ARCHEOLOGICAL RESOURCES

Affected Environment

Human beings inhabited the eastern seaboard for at least 11,000 years before the Europeans began settling in the 17th century. Cultural history before 1550, when the Spanish explored the lower Chesapeake Bay, is prehistory, and the only knowledge of it has been obtained through archeological investigations. At the time of the first European settlements, the population of what is now Virginia was probably less than 30,000.

Prehistoric Period

Paleo-Indian Period

The Paleo-Indian period spanned approximately 4,000 years (12,000-8,000 B.C.) There is a possibility that Paleo-Indian projectile point/sites are located in the Blue Ridge Mountains. However, only one point dating to this period has been recovered in this region. The fact that these points are widely distributed, that sites of this period have been reported by the North Carolina and Virginia archeological societies, and that no surveys have been done in this area, all suggest that there is a potential for locating Paleo-Indian sites.

Archaic Period

The Archaic period spanned some 7,500 years and is divided into three parts –Early (8,000-6,000 B.C.), Middle (6,000-4,000 B.C.), and Late (4,000-1,500 B.C.). The Early Archaic is well represented in sites and collections in Virginia. Middle Archaic sites are ubiquitous across the state of Virginia, with the artifacts reflecting the development of circumscribed territories and new and varied functional needs. These artifacts were manufactured from different materials based on needs.

Woodland Period

The beginning of the Woodland period is marked by the appearance of ceramic vessels at archeological sites. In Virginia Early Woodland sites have yielded few such artifacts, and projectile points from this period are often almost indistinguishable from those of earlier periods.

The Middle Woodland period (500 B.C.-A.D. 900) is represented in southwestern Virginia by limestone-tempered pottery, occasionally with stamped motifs, and several distinct types of projectile points.

The Late Woodland period, which extends from A.D. 900 to the 1600's marks the time when native cultures settled into the configuration encountered by early settlers and explorers in the 17th century. This configuration was based on the production of such crops as maize. Late Woodland sites in southwestern Virginia are larger and more complex than those of earlier periods.

Historic Period

Various Indian groups inhabited the Roanoke Valley before European settlement in the mid-18th century. Two Virginians, Thomas Batts and Robert Fallam, made the first documented exploration of the region in

1671. Their account identifies a village occupied by the Totera (or Tutelo) in the Roanoke area. The site was apparently south of Roanoke, although other accounts have disputed the location.

Siouan-speaking groups inhabited the Piedmont region of Virginia and North Carolina, along with the Saponi, Monacons, and Mangahoaks. After the Batts and Fallam expedition, no recorded accounts exist of the inhabitants of Virginia in the Roanoke area for the later 17th and early 18th centuries.

In 1736 settlers from northern Maryland arrived in the Roanoke Valley. Early settlers engaged primarily in subsistence farming and had few livestock.

In 1745 the colonial legislature ordered the Warwick Road to be cleared (the route later followed by US 460). In 1746 the Valley Road, also known as the Carolina or Wilderness Road, was cleared from the Potomac River through the Shenandoah Valley. This road is shown on the 1777 Fry-Jefferson map as the “Great Road from Philadelphia to Yadkin River.”

The growing population justified the creation of Botetourt County in 1770. Toward the end of the 18th century and the beginning of the 19th the migration of two groups into the Roanoke Valley further swelled the population. German and Swiss settlers came from Virginia’s Tidewater and Piedmont regions. Salem was established in 1806 and became the county seat for Roanoke County.

As the crossroads of the Hollins, Warwick, and Franklin roads, the area around Big Lick (the original name for Roanoke) was long recognized as a transportation center. In 1852 the Virginia and Tennessee Railroad was routed through the area, further affirming its strategic location. During the Civil War this railroad was subsequently the focus of three raids by Union troops. The first, in December 1863, destroyed the train depot and tracks in Salem.

After the Civil War the local economy was on the upswing, and Big Lick was chartered as a town in 1874. High post-war prices for tobacco supported several manufacturers of plug and smoking tobacco. The area’s importance as a major rail hub was realized in 1881 with the opening of the Shenandoah Valley Railroad, later the Norfolk and Western. The resulting economic boom prompted citizens to petition the Virginia legislature for chartering the town as a city, and the name was changed to Roanoke. Vinton was formed in 1862.

During the 20th century Roanoke has remained a manufacturing, mercantile, service, and transportation center for the Appalachian region of southwestern Virginia, southeastern West Virginia, and eastern Kentucky.

In accordance with 36 CFR Part 800.6(a)(1)(i)(C) and Part 800.14(b) (1) (ii), the Blue Ridge Parkway entered into a Programmatic Agreement for the proposed Roanoke Valley/BLRI Trail Plan in May 2010. The Blue Ridge Parkway sought the participation of American Indian Tribes traditionally associated with the Parkway including: the Tuscarora Nation, Eastern Shawnee Tribe of Oklahoma, Absentee Shawnee Tribe of Oklahoma, Catawba Indian Nation, United

Keetoowah Band of Cherokee Indians, Cherokee Nation, Eastern Band of Cherokee Indians, and the Shawnee Tribe (see **Figure A-9**). The ACHP and Virginia SHPO were also invited to participate.

Preparation of a PA is necessary since effects on historic properties could not be fully determined at this point [800.14(b)(1)(ii)]. In addition, the process and documentation required for the preparation of this EA would be used to comply with Section 106 of the National Historic Preservation Act in accordance with Section 800.8(c) of the ACHP’s regulations (36 CFR Part 800) (see **Figure A-10**). The PA records

the terms and conditions agreed upon to resolve and mitigate the potential adverse effects of the proposed action. No Section 106 *Assessment of Effects* has been completed since the effects on cultural resources of implementing any of the alternatives are not fully known.

Methodology

The thresholds of change for the intensity of an impact on archeological resources are defined as follows:

Negligible

Archeological resources would not be affected or the effects would be below the level of detection. A “negligible effect” corresponds to a “no effect” determination by the park for Section 106 purposes. Informal consultation with State Historic Preservation Office might occur, but would not be required.

Minor

Effects to archeological resources would be detectable, although the effects would result in little, if any, loss of significance or integrity. The National Register eligibility of the historic resource, if appropriate, would not be affected by the project. A “minor effect” corresponds to a “no adverse effect” determination by the park for Section 106 purposes. Consultation with the SHPO would occur.

Moderate

Effects to archeological resources would be readily detectable and would have the potential to diminish the significance or integrity of the site, and could jeopardize its National Register eligibility. A “moderate effect” corresponds to either an “adverse effect” or a “no adverse effect” for Section 106 purposes, depending on mitigation measures proposed.

Major

Effects to archeological resources would be obvious, long-term, and would diminish the significance and integrity of the site to the extent that it is no longer eligible for listing in the National Register. A “major effect” would correspond to an “adverse effect” for Section 106 purposes.

The thresholds of change for the duration of an impact on archeological resources are defined as follows:

Short-term: Occurs only during project implementation activities.

Long-term: Extend beyond project implementation activities.

Impacts of Alternative A – No Action

The existing trail system was established without Phase I archeological surveys. Though there are no known problems or incidents of archeological theft or degradation on the surface, it is not known whether the trail provides access to important sites or if archeological resources exist nearby. When funds allow, Phase I surveys would be conducted at high priority sites (high potential for archeological resources).

Cumulative Effects

After the fact archeological surveys would help protect cultural resources, should they be discovered. However, some slopes within the park would not be conducive to archeological remnants, intact or otherwise. No determination has been made on whether archeological sites are present within the current trail corridor. It is not known whether archeological sites are currently in jeopardy from erosion due to visitor traffic or looting. Given the small area of disturbance from the existing trail system, it is not thought that National Register eligible sites are being impacted from current use.

Conclusion

Because the current condition of possible archeological sites located in existing trails is unknown, impacts to archeological resources under Alternative A would be moderate and adverse for the short- and long-term.

Should archeological remains be located along the existing trail, the long-term effects would be moderate and adverse since the deposits would be exposed to erosion and looting. Block excavations by qualified professional archeologists would be necessary to mitigate this adverse effect.

Impacts of Alternative B – Expanded Trail System with Connections

Uninformed construction of additional trails could have an adverse effect on cultural resources. Thus, Phase I archeological surveys would be required prior to the construction of new trails, as per the 2010 PA. The reconnaissance level survey would identify all archeological sites within the proposed trails corridor and allow changes in the proposed trail layout to avoid known archeological sites. Outside funding sources would be needed, since there are no available funds from NPS to meet this legal requirement.

Cumulative Effects

No additional degradation to that which has already taken place through urbanization would be realized under this alternative. Archeological testing prior to trail construction, as per the 2010 PA, would result in the identification of all archeological sites within the proposed trail corridor.

This would allow rerouting of the trail to avoid archeological sites that may be eligible for listing on the National Register of Historic Places.

Conclusion

Implementation of Alternative B would not lead to an impairment of archeological resources because adverse effects to archeological resources would be none to negligible for the short- and long-term since Phase I investigations would be undertaken to determine if archeological deposits were present and to establish their locations and boundaries before the trail or parking areas would be constructed. This would allow rerouting of the trail or relocation of parking areas to avoid disturbance of these sites. If sites could not be avoided, Phase III mitigations would occur after consultation with the SHPO, as per the 2010 PA.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

There would be no new adverse effects to archeology under this alternative. Adverse effects would be the same as for Alternative B.

Cumulative Effects

Cumulative adverse effects would be the same as for Alternative B.

Conclusion

There would be no impairment to park archeological resources under this alternative because the impacts would be negligible for the short- and long-term since Phase I investigations would be undertaken before new trail or parking areas would be constructed.

SOCIOECONOMIC ENVIRONMENT

Affected Environment

The section of Parkway that would be affected by the proposed trail plan is between MP 110.6 and 126.2, Section 1M, in Roanoke County. Therefore, the affected socioeconomic environment is defined as local communities within the specified area. This would include both the Cities of Roanoke and Vinton and Roanoke County, that could be economically impacted or see quality of life impacts from the proposed alternatives.

Methodology

The thresholds of change for the intensity of an impact on the socioeconomic environment are defined as follows:

Negligible

No measurable effect on the socioeconomic environment, including employment and income levels and quality of life issues; population migration or immigration.

Minor

Impacts would include small changes in employment and income levels, quality of life issues, and/or population migration or immigration but no change to basic socioeconomic function and structure. Only a small sector of the local and regional economies would be affected and impacts would not be readily apparent (for example, only users of the trail system would see an impact).

Moderate

Impacts would include larger changes in employment and income levels, quality of life issues, and/or population migration or immigration but no change to basic socioeconomic function and structure. A larger sector of the socioeconomic environment, or the relationship between sectors of the local and regional economies would be affected, though impacts may still not be readily apparent (for example, trail users and associated trail businesses may see an impact, but not the greater community).

Major

Changes to the local and regional economies would occur and impacts would become readily apparent in the form of shifts in socioeconomic functions and structure. In certain cases, entirely new economic sectors would be created or eliminated. Impacts would cause readily apparent changes to employment and income levels; quality of life issues; population migration or immigration (for example, sectors of the economy beyond trail associated businesses would be affected and residents of the entire area would experience impacts).

The thresholds of change for the duration of an impact on the socioeconomic environment are defined as follows:

Short-term: Occurs only during project implementation activities.

Long-term: Extend beyond project implementation activities.

Impacts of Alternative A – No Action

Current management actions of traditional recreational use, use of the motor road and associated vistas, and management of those resources would continue under the No Action Alternative. There would be no development of new facilities, trails or trail connections, nor an increase in employment or jobs created under this alternative. There could be long-term, adverse impacts due to loss of tourism and local revenue associated with an improved trail system. Socioeconomic conditions would continue as they are currently; tourism would continue to be adversely affected by degrading trails and lack of trail connectivity. Under this alternative, VDOT would be contacted to help develop a safe crossing of SR 24 (possibly including additional signalization) and signage or pavement markings at Hardy Road and other state route locations. If this crossing were realized, it would result in long-term, beneficial impacts on the socioeconomic environment by providing a safer and more appealing and amenable place to ride, increasing the quality of life for local communities and attracting users.

Cumulative Effects

Other projects in the area include the implementation of the Roanoke Valley Greenway Plan. Since this alternative proposes continuation of current management, which would include no connections to that trail system, there would be no cumulative effects. Under the No Action Alternative, communities would continue to be disconnected from the Parkway as they currently are.

Conclusion

The No Action Alternative could provide long-term, beneficial impacts to the socioeconomic environment from improved safety in crossing SR24 and Hardy Road. There may be long-term, negligible, adverse impacts to economic revenue and quality of life as the trails would continue to degrade and there would be no connections beyond the Parkway, as these conditions would not draw tourists and trail users to the area.

Impacts of Alternative B – Expanded Trail System with Connections

Under Alternative B, there would be the addition of loop trails, parking, additional trail crossings, and connections to the Roanoke Valley Greenway system. There could be a beneficial impact on quality of life for local residents, as well as an increase in recreational tourism, if Parkway trail connection opportunities were maximized, parking and amenities provided for and safe crossing opportunities realized. Safer and additional opportunities for pedestrians and cyclists could also result in a benefit to riders and provide local economies with added economic benefits if riders pass through those communities and stop for services and amenities, or outdoor enthusiasts relocate to the area increasing tax revenues and spending on the outdoor sector of the economy. A connected trails system could benefit local economies by tying them more closely to the Parkway, a “national destination,” and by providing new opportunities for associated trail businesses. All of these impacts would be long-term and beneficial, depending on the scale of the regional trail system and increase in use.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, the long-term impacts could be increased. The creation of a large greenway loop or system of trails connecting the Roanoke Valley to the Parkway could attract more visitors to the region and the Parkway, increasing tourism and business opportunities, and providing quality of life benefits for regional residents. New residents may be attracted to the area, increasing tax revenues and spending on the outdoor sector of the economy. These impacts would be long-term and beneficial, depending on the scale of the regional trail system and increase in use.

Conclusion

Under Alternative B, the development of new trails, trail connections, parking, and trail connections through the Roanoke Trail Plan could provide quality of life benefits to local residents and increases in tourism, as well as potential business and economic (income generating) opportunities related to trail use. These impacts would be long-term and beneficial, depending on the scale of the regional trail system connecting to the Parkway.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

Under Alternative C, the addition of loop trails, parking, additional trail crossings, connections to the Roanoke Valley Greenway system and construction of mountain bike and pedestrian trails adjacent to the Roanoke River Parkway would occur. There could be a beneficial impact on quality of life for local residents, as well as an increase in recreational tourism, if Parkway trail connection opportunities were maximized, parking and amenities provided for and safe crossing opportunities realized. Safer and additional opportunities for pedestrians and cyclists could also result in a benefit to riders, and provide local economies with added economic benefits if riders pass through those communities and stop for services and amenities, or outdoor enthusiasts relocate to the area increasing tax revenues and spending on the outdoor sector of the economy. A connected trails system could benefit local economies by tying them more closely to the Parkway, a “national destination,” and by providing new opportunities for associated trail businesses and introducing a new use which could provide additional business opportunities. All of these impacts would be long-term and beneficial, depending on the scale of the regional trail system and increase in use.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, the long-term impacts could be increased. The creation of a large greenway loop or system of trails connecting the Roanoke Valley to the Parkway could attract more visitors to the region and the Parkway, which could increase tourism and business opportunities and provide quality of life benefits for regional residents. New residents may be attracted to the area, increasing tax revenues and spending on the outdoor sector of the economy. Additionally, the introduction of mountain biking could provide additional business opportunities. These impacts could be long-term and beneficial, depending on the scale of the regional trail system and increase in use.

Conclusion

Under Alternative C, the development of new trails, trail connections, parking, trail connections through the Roanoke Trail Plan and introduction of mountain biking could provide quality of life benefits to local residents and increases in tourism, as well as potential business and economic (income generating) opportunities related to trail use. These impacts would be long-term and beneficial, depending on the scale of the regional trail system connecting to the Parkway.

VISITOR USE AND EXPERIENCE, INCLUDING RECREATION AND VISUAL RESOURCES

Affected Environment

A trip down the Parkway provides stunning, long-range vistas and close-up looks at the natural and cultural history of the southern Appalachian Mountains. The 469-mile drive is designed as a “drive-awhile and stop-awhile” experience intended to encourage leisurely progress and frequent stops.

The Blue Ridge Parkway offers a diversity of recreational activities for people with a wide range of interests, physical abilities, and time available. Popular activities for vehicle-based visitors include sightseeing, picnicking, viewing wildflowers and fall color, photography, hiking, bird watching, and Ranger guided programs. It is also possible to rock climb, fish for trout, and bicycle. Camping is also allowed at designated sites.

There have been 17-20 million visitors to the Blue Ridge Parkway every year since 1997. As the Parkway is 469 miles long, not all visitors travel its entire length. According to a recent survey of visitors to the Parkway (Valliere et. al, 2002), the most popular activities reported were scenic driving/stopping at overlooks (88.1%), visiting visitor centers (60.5%), hiking (59.0%), picnicking (39%), purchasing something at visitor center stores (37.2%), and visiting historic sites (33.7%).

The section of Parkway affected by this trail plan is between MP 110.6 and 126.2, Section 1-M, in Roanoke County, Virginia. Visitor use and experience impacts would be limited to those activities and experiences that occur on or along this section of Parkway and adjoining trail system (in Alternatives B and C), including recreational use and experiencing and enjoying Parkway and trail visual resources and viewsheds.

Methodology

Public scoping input and observation of visitation patterns, combined with assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives in this EA. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources and objectives presented in the park significance statement.

The thresholds of change for the intensity of an impact on visitor use and experience are defined as follows:

Negligible

Changes in visitor use and/or experience, including changes in recreation and visual resources, would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.

Minor

Changes in visitor use and/or experience, including changes in recreation and visual resources, would be detectable, although the changes would be slight. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

Moderate

Changes in visitor use and/or experience, including changes in recreation and visual resources, would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.

Major

Changes in visitor use and/or experience, including changes in recreation and visual resources, would be readily apparent and severely adverse or exceptionally beneficial. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

The thresholds of change for the duration of an impact on visitor use and experience are defined as follows:

Short-term: Occurs only during project implementation activities.

Long-term: Extend beyond project implementation activities.

Impacts of Alternative A – No Action

Under the No Action Alternative, current management actions of traditional recreational use, use of the motor road and associated vistas and management of those resources would continue. This alternative would not result in the development of new facilities, trails or trail connections. Trails would be left in existing condition and would continue to degrade. There is the potential to degrade the visual character of the area as cars would continue to park along the roadway absent new parking and trailhead facilities or official trail connections and, therefore, destroying vegetation. These conditions would have a long-term, minor to moderate and eventually major, adverse impact on visitor use and experience as the quality and diversity of uses would stay the same, trails would continue to degrade and visual quality would be impacted by parking and destruction of vegetation.

Developing a safe crossing of SR 24 (possibly including additional signalization) and signage or pavement markings at Hardy Road and other state routes would result in a long-term, beneficial impact on visitor use and experience, as users would be safer and more comfortable riding in those areas and change would be noticeable.

Cumulative Effects

Other projects in the area include the implementation of the Roanoke Valley Greenway Plan. Because this alternative proposes continued action which would include no connections to that trail system, there would be no cumulative effects from implementation of this alternative. Communities would continue to be disconnected from the Parkway.

Conclusion

Under Alternative A, trails would be left in their existing condition and would continue to degrade and visual character would be diminished by roadside parking and trail staging. There would be a long-term, minor to moderate and eventually major, adverse impact on visitor use and experience. There could be long-term, beneficial impacts to visitor use and experience from improved safety in crossing SR24 and Hardy Road.

Impacts of Alternative B – Expanded Trail System with Connections

Under Alternative B, new Parkway trails and trail connection opportunities would be maximized, parking and amenities provided, and safe crossing opportunities realized. Safer opportunities for pedestrians and cyclists could result from improved crossings. Improved trail conditions and connections could provide a more beneficial user experience. Increased parking would eliminate the need for users to park and stage on the roadside destroying vegetation. A trail system connecting the Parkway to the Roanoke Valley would tie local communities closely to the Parkway and provide new opportunities for people to ride within the Roanoke Valley Parkway corridor. These changes could result in long-term, beneficial impacts on visitor use and experience, depending on the scale of the regional trail system connecting to the Parkway.

Overcrowding on some trails and parking areas and possibly campgrounds in the region could lead to more dissatisfied visitors under this alternative causing long-term, minor, adverse impacts on visitor use and experience. Visitor use and experience would be affected in the short-term through noise, aesthetic and traffic-related effects during trail construction. However, allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and creating a more positive visitor experience, resulting in a long-term, beneficial impact.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, the long-term beneficial impacts to visitor use and experience could be magnified. The creation of a large greenway loop or system of trails connecting to the Parkway could provide safer, more abundant and more varied user experiences resulting in a long-term, beneficial impact, depending on the scale of the regional trail system connecting to the Parkway.

More connections could result in overcrowding on some trails and parking areas and possibly campgrounds in the region which could lead to more dissatisfied visitors causing long-term, adverse, minor impacts on visitor use and experience. However, allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and creating a more positive visitor experience, resulting in a long-term, beneficial impact.

Conclusion

Implementation of Alternative B, which includes the development of new trails, trail connections, parking and trail connections through the Roanoke Trail Plan, could provide long-term, beneficial impacts to visitor use and experience. There could be adverse impacts if crowding would become an issue, which could be offset by more opportunities for use which would disperse visitors and alleviate crowding on Parkway trails.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

Under Alternative C, new Parkway trails and trail connection opportunities would be maximized, parking and amenities provided, safe crossing opportunities realized and pedestrian and mountain biking allowed on newly constructed trails adjacent to Roanoke River Parkway. Safer opportunities for pedestrians and cyclists could result from improved crossings. Improved trail conditions and connections could provide a more beneficial user experience. Increased parking would eliminate the need for users to park and stage on the roadside destroying vegetation. A trail system connecting the Parkway to the Roanoke Valley would tie local communities closely to the Parkway and provide new opportunities for people to ride within the Roanoke Valley Parkway corridor. These changes could result in long-term, beneficial impacts on visitor use and experience, depending on the scale of the regional trail system connecting to the Parkway.

There is a potential short to long-term major impact from the construction of mountain bike trails adjacent to Roanoke River Parkway Trails. This impact has the potential to be either adverse or beneficial, depending on the absence or existence of user conflict between users biking and hiking on the trail.

Overcrowding on some trails and parking areas and possibly campgrounds in the region could lead to more dissatisfied visitors under this alternative, causing long-term, adverse, minor impacts on visitor use and experience. However, allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and creating a more positive visitor experience, resulting in a long-term, beneficial impact.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, the long-term beneficial impacts to visitor use and experience could be magnified. The creation of a large greenway loop or system of trails connecting to the Parkway could provide safer, more abundant and more varied user experiences resulting in long-term, beneficial impacts, depending on the scale of the regional trail system connecting to the Parkway.

More connections could result in overcrowding on some trails and parking areas and possibly campgrounds in the region, and could lead to more dissatisfied visitors causing long-term, minor adverse impacts on visitor use and experience. However, allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and creating a more positive visitor experience, resulting in a long-term, beneficial impact.

Conclusion

Under Alternative C, the development of new trails, trail connections, parking, trail connections through the Roanoke Trail Plan and introduction of mountain biking could provide a long-term, beneficial impact to visitor use and experience. There could be adverse impacts if crowding would become an issue, which could be offset by more opportunities for use which would disperse visitors and alleviate crowding on Parkway trails. There is also a potential short to long-term, beneficial impact from the addition of mountain biking to Roanoke River Parkway Trails. The addition of bike access from secondary roads to the motor road would eliminate unauthorized trails with Parkway grass bays.

HUMAN HEALTH AND SAFETY

Affected Environment

The section of Parkway affected by this trail plan is between MP 110.6 and 126.2, Section 1M in Roanoke County, Virginia. Human health and safety impacts would be limited to those accidents/incidents that impact human health and/or safety on or along this section of Parkway and adjoining trail system (in Alternatives B and C).

Methodology

Existing and potential threats to human health and safety within the project area were identified and evaluated in the impact analysis. The potential for project implementation to worsen or improve existing threats or to create new threats to human health and safety was evaluated.

The thresholds of change for the intensity of an impact on human health and safety are defined as follows:

Negligible

Human health and safety would not be affected, or the effects would be at the lowest levels of detection and would not have an appreciable effect on human health and safety.

Minor

The effect would be detectable but would not have an appreciable effect on human health and safety. If mitigation were needed, it would be relatively simple and would likely be successful.

Moderate

The effects would be readily apparent and result in substantial, noticeable effects to human health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.

Major

The effects would be readily apparent and result in substantial, noticeable effects to human health and safety on a regional scale. Extensive mitigation measures would be needed and success would not be guaranteed.

The thresholds of change for the duration of an impact on human health and safety are defined as follows:

Short-term: Effects last one year or less.

Long-term: Effects last longer than one year.

Impacts of Alternative A – No Action

Under this alternative, continuation of current management actions of traditional recreational use, use of the motor road and associated vistas and management of those resources would not appreciably change the health and safety atmosphere along the Parkway. If trails were left in existing condition and continued to degrade, there could be a long-term, minor, adverse impact to human health and safety as accidents would become more probable on the degraded trails which have deteriorating pavement and/or ruts.

VDOT would be contacted to help develop a safe crossing of SR 24 (possibly including additional signalization) and signage and pavement markings at Hardy Road and other state routes, which would result in a long-term, beneficial impact on human health and safety by presumably decreasing the probability of accidents/incidents.

Cumulative Effects

Other projects in the area include the implementation of the Roanoke Valley Conceptual Greenway Plan. Under this alternative, current management direction would continue including no connections to the Roanoke Valley trail system. There would be no cumulative effects from implementation of this alternative as users would continue to be disconnected from the Parkway.

Conclusion

Under the No Action Alternative, trails would continue to degrade if left in existing condition, and there would be a long-term, minor, adverse impact on health and safety. However, there would be a long-term, beneficial impact to health and safety from improved safety in crossing SR24 and Hardy Road.

Impacts of Alternative B – Expanded Trail System with Connections

Safer opportunities for pedestrians and cyclists would result from improved crossings as well as from improved trail conditions, trail connections and improved parking under Alternative B. Improvements would be designed with safety in mind. These changes would have a long-term, beneficial impact on health and safety.

Improvements could result in overcrowding on some trails and parking areas and possibly campgrounds in the region. Under Alternative B, crowding and increased usage spread over a larger trail area could lead to more accidents/incidents. Allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and potentially decreasing the number

of incidents. Creating additional trail accesses to and across the motor road would provide increased opportunity for incidents. The increased potential for accidents/incidents would result in a long-term, minor to moderate, adverse impact on health and safety.

Cumulative Effects

Other projects in the area include the RVCGP, and if the Greenways continued to implement the plan, visitor use would increase. More trail connections to and across the motor road providing more use and access could result in more accidents/incidents causing a long-term, minor to moderate, adverse impact on health and safety.

Conclusion

Under Alternative B, improvements to the trail system and existing crossings would have a long-term, beneficial impact on health and safety. However, increased use and creation of more access to and across the motor road for users could result in long-term, minor to moderate, adverse impacts on health and safety as the likelihood of accidents/incidents would increase.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

Under Alternative C, safer opportunities for pedestrians and cyclists would result from improved crossings as well as from improved trail conditions, trail connections and improved parking. Improvements would be designed with safety in mind. These changes would have a long-term, beneficial impact on health and safety along the Parkway.

Improvements could result in overcrowding on some trails and parking areas and possibly campgrounds in the region. Crowding and increased usage spread out over a larger trail area could lead to more accidents/incidents. However, allowing new trail construction and trail connections to the greater Valley trail system could disperse trail use, diminishing crowding and potentially decreasing the number of incidents. Also, creating additional trail accesses to and across the motor road would provide increased opportunity for incidents. The increased potential for accidents/incidents would result in long-term, minor to moderate, adverse impacts on health and safety.

Finally, the addition of a new trail system for mountain bikes and hiking use has the potential to increase incidents/accidents as there would be more users, users would be travelling at different rates of speed, and all users would have to learn to adjust to new trail use and conditions. The increased potential for accidents/incidents under this alternative would result in short to long-term, minor to moderate, adverse impacts on health and safety. This impact could be mitigated through design, enforcement and educational activities, or use restrictions as a management tool.

Cumulative Effects

Other projects in the area include the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, visitor use would be increased. More trail connections to and across the motor road providing more use and access could result in more accidents/incidents under this alternative, causing long-term, minor to moderate, adverse impacts on health and safety.

Conclusion

Under Alternative C, improvements to the trail system and existing crossings would have long-term, beneficial impacts on health and safety. However, increased use and creation of more access to and across the motor road for users would result in long-term, minor to moderate, adverse impacts on health and safety as the likelihood of accidents/incidents would increase. The addition of a new use, “mountain

bicycling” has the potential to increase incidents/accidents as there would be more users, users would be travelling at different rates of speed, and all users would have to learn to adjust to new trail use and conditions. The increased potential for accidents/incidents would result in short to long-term, minor to moderate, adverse impacts on health and safety. This impact may be mitigated through design, enforcement and educational activities, or use restrictions as a management tool.

PARK OPERATIONS

Affected Environment

The section of Parkway affected by this trail plan is between MP 110.6 and 126.2, Section 1-M, in Roanoke County, Virginia. Impacts to park operations would be limited to those that increase costs, staff commitments, or other operational considerations along this section of Parkway and adjoining trail system (in Alternatives B and C).

Methodology

Existing and potential impacts on park operations within the project area were identified and evaluated in the impact analysis. The potential for project implementation to hinder or improve park operations, to create new operational costs, or to realize operational savings were evaluated.

The thresholds of change for the intensity of an impact on park operations are defined as follows:

Negligible

Impact of the alternative would have no measurable impact on park operations.

Minor

Implementation of the alternative would affect park operations in a small way that would be difficult to measure. The impacts on the park’s budget and staff workload would be short-term, with little material effect on existing programs.

Moderate

Implementation of the alternative would measurably affect park operations. Park staff workloads and priorities would need to be rearranged to implement new management actions, and as a result, existing programs would be reduced in scope or potentially eliminated.

Major

Implementation of the alternative would have a highly noticeable effect on park operations. Funding for management actions would exceed the current park’s budget by 10%, consume all discretionary funding, and require additional personnel over and above what would normally be expected to be funded.

The thresholds of change for the duration of an impact on park operations are defined as follows:

Short-term: Occurs only during project implementation activities.

Long-term: Extend beyond project implementation activities.

Impacts of Alternative A – No Action

Under the No Action Alternative, continuation of current management actions of traditional recreational use, use of the motor road and associated vistas, and management of those resources would not impact Parkway operations above normal and scheduled interpretive, resource management, maintenance and enforcement activities. Trails would be left in their existing condition and would continue to degrade and there could be a long-term, minor and adverse impact to park maintenance operations and potentially to park resource management activities.

Costs associated with specific, immediate search and rescue or emergency services (i.e. accidents or incidents beyond normal operational activity) would be temporary, lasting only from the time of immediate evacuations/law enforcement assistance and the repair of trail damage. Therefore, short-term, minor to moderate, localized, adverse impacts may be anticipated.

At current staffing levels, operational efficiency in protecting visitors, maintaining trails and associated facilities, and protecting park resources would be diminished as the trail system continues to deteriorate and unauthorized trail use continues.

Cumulative Effects

Other projects in the area include the implementation of the Roanoke Valley Greenway Plan. The No Action Alternative continues current management direction which includes no connections to the Roanoke Valley trail system. There would be no cumulative effects on park operations from implementation of this alternative.

Conclusion

Continuation of current management actions of traditional recreational use, use of the motor road and associated vistas, and management of those resources under this trail plan would have few additional impacts on park operations above normal and scheduled interpretive, resource management, maintenance and law enforcement activities. Over time, there would be a long-term, minor and adverse impact to park maintenance operations and resource management activities, as trails would need more repair and resource damage would continue to occur.

Impacts of Alternative B – Expanded Trail System with Connections

The implementation of Alternative B, which includes new trail segments, new trail connections and road crossings and new parking, would increase lifecycle maintenance costs to the park. Maintenance of trails is a major work item. Proper design, installation, and maintenance are critical for resource protection and visitor enjoyment. While new trail construction (approximately 6.25 miles) would be completed by volunteers, the NPS would incur some short-term costs in supplies and oversight. Using volunteers to assist with trail clean up and maintenance would offset some long-term costs; however, it is assumed that by adding assets to the Parkway inventory there would be long-term costs associated with their maintenance (i.e. parking lot resurfacing) as they would be administered by the NPS. This long-term impact would be minor to moderate (increasing over time as assets need replacement) and adverse on park operations.

In addition, the operational efficiency of law enforcement monitoring of trail closures and the expanded trail system diminishes given existing staffing constraints. Monitoring and enforcement of the trail system and trail closures, along with safety education, would entail diverting NPS staff from other duties or hiring additional non-commissioned seasonal visitor use assistants. Widening and upgrading of trails

may generate increased unauthorized all-terrain vehicle (ATV) use, necessitating more law enforcement presence. These conditions would create a long-term, minor to moderate and adverse impact on park operations in the district and park-wide.

Costs associated with specific, immediate search and rescue or emergency services (i.e. accidents or incidents above and beyond normal park operations) would be temporary, lasting only from the time of immediate evacuations/law enforcement assistance and the repair of trail damage. Therefore, short-term, minor to moderate, localized, adverse impacts may be anticipated.

Creation of outreach materials and interpretive programs on trails, safety and resource concerns could create an additional work load on staff. This would likely be a long-term, minor and adverse impact as limited staff would be diverted from programmed activities.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, visitor use would increase. More trail connections to and across the motor road and to Parkway trails would provide more use and access. This could result in more accidents/incidents, greater need for education and monitoring, and increased maintenance costs. Effects outlined above would be increased with the connection of trails in the surrounding community to the Blue Ridge Parkway.

Conclusion

Under Alternative B, improvements to the trail system including new trails, trail connections and parking would increase trail traffic and use and would result in impacts to Parkway operations. While some issues related to crowding could be offset by dispersed use over a larger trail system, any increase in visitors would cause an impact to park operations. Under this alternative, expanding the trail system and providing connections and access to and over the motor road, could result in more accidents/incidents or at the least a need for more law enforcement, monitoring and additional safety and outreach activities. Working with volunteer groups would necessitate increased time in training, oversight and coordination. New facilities would increase lifecycle maintenance costs. Given existing staffing levels (assumed for the foreseeable future) implementation of this alternative would cause a long-term, minor to moderate, adverse impact to park operations in the district and park-wide.

Impacts of Alternative C – Expand Trail System with Connections and Mountain Biking (Preferred Alternative)

The implementation of Alternative C which includes new trail segments, new trail connections and road crossings, new parking, and introduction of a new use on the Parkway would increase lifecycle maintenance costs to the park. Maintenance of trails is a major work item. Proper design, installation, and maintenance are critical for resource protection and visitor enjoyment. While new trail construction would be completed by volunteers' private funds or grants, the NPS would incur some short-term costs in supplies and oversight. Using volunteers to assist with trail clean up and maintenance would offset some long-term costs; however, it is assumed that by adding assets to the Parkway inventory there would be long-term costs associated with their maintenance (i.e. parking lot resurfacing) as they would be administered by the NPS. This long-term impact would be minor to moderate (increasing over time as assets need replacement) and adverse on park operations in the district and park-wide.

In addition, the operational efficiency of law enforcement monitoring of trail closures and the expanded trail system diminishes given existing staffing constraints. With introduction of a new park use, monitoring and enforcement of the trail system and trail closures, along with safety education, would

necessitate diverting NPS staff from other duties or hiring additional non-commissioned seasonal visitor use assistants. Volunteer groups may be utilized for trail patrolling and monitoring; however, they would not be commissioned and NPS staff would have to provide oversight and respond to accidents/incidents. Widening and upgrading of trails may generate increased unauthorized all-terrain vehicle (ATV) use, necessitating more enforcement presence. These conditions would create a long-term, minor to moderate, adverse impact on park operations in the district and park-wide.

Costs associated with specific, immediate search and rescue or emergency services (i.e. accidents or incidents above and beyond normal park operations) would be temporary, lasting only from the time of immediate evacuations/law enforcement assistance and the repair of trail damage. Therefore, short-term, minor to moderate, localized, adverse impacts may be anticipated.

With introduction of a new use, education becomes more critical to ensure resource protection and visitor safety and enjoyment. Creation of outreach materials and interpretive programs on trails, safety, and resource concerns could create an additional work load on staff. This would likely be a long-term, minor and adverse impact as limited staff would be diverted from programmed activities.

Cumulative Effects

Other projects in the area include the implementation of the RVCGP. If Roanoke Valley Greenways continues to implement the trail plan, visitor use would increase. More trail connections to and across the motor road and to Parkway trails would provide more use and access. This could result in more accidents/incidents, greater need for education, monitoring, and enforcement and increased maintenance costs. Effects outlined above would be increased with the connection of trails in the surrounding community to the Blue Ridge Parkway.

Conclusion

Under Alternative C, improvements to the trail system including new trails, trail connections, parking and introduction of a new use on the Parkway, would increase trail traffic and use and would result in impacts to Parkway operations. While some issues related to crowding could be offset by dispersed use over a larger trail system, any increase in visitors would cause an impact to park operations. Under this alternative, expanding the trail system, introducing a new use and providing connections and access to and over the motor road, could result in more accidents/incidents, or at the least a need for more enforcement, monitoring, and additional safety and outreach activities. Working with volunteer groups would necessitate increased time in training, oversight and coordination. New facilities would increase lifecycle maintenance costs. Given existing staffing levels (assumed for the foreseeable future), implementation would cause a long-term, minor to moderate, adverse impact to park operations in the district and park-wide.