

Transportation improvement projects typically include consideration of Transportation System Management (TSM) and Mass Transit alternatives. These alternatives are usually relevant only for major projects that are proposed in urbanized areas with populations over 200,000.

The TSM alternative can include a variety of strategies for maximizing the efficiency and effectiveness of existing transportation facilities. Since the study area's main east-west route (NC 28, US 19/US 74) is operating at an acceptable level of service (LOS) and the purpose and need for the project does not include travel efficiency improvements, TSM options were eliminated from further study.

Mass Transit includes reasonable and feasible transit options, such as bus or rail. No public bus service is currently operating in the area. Furthermore, because of the need for flat grades and gentle curves, the construction of a rail line through the study area would cause much greater environmental damage than any of the partial-build or build alternatives evaluated in this document. For these reasons, Mass Transit was eliminated from further study.

Whereas NC 28 and US 19/US 74 have adequate capacity to serve through and local east-west traffic south of the lake, they offer no access to the north shore of Fontana Lake. Although the existing route adequately serves local and through traffic, it does not provide a visitor driving experience within GSMNP. The 1943 Agreement specified a road on the north shore of Fontana Lake, connecting Bryson City and Deal's Gap. While the existing road system provides an east-west connection from Bryson City to Deal's Gap, it is doubtful that improving the present system would meet the full intent of the 1943 Agreement because NC 28 does not traverse north of Fontana Lake. Therefore, any plans to improve existing NC 28 were eliminated from further consideration.

#### **2.1.4 Initial Partial-Build and Build Concepts Considered**

The initial partial-build and build concepts are shown as corridor segments in Figure 2-5. These concepts were part of the initial options previously discussed, which during preliminary review met the project's purpose and need, goals and objectives, and were considered reasonable. The screening criteria and roadway design criteria were used to locate these corridor segments. Because of the rugged terrain, engineering constraints such as the horizontal and vertical alignment were given careful consideration in the development of these corridor segments. After a review of the corridor segments, certain segments and destination locations were eliminated from further study due to the anticipated magnitude of their impacts as compared with the other corridor segments. The anticipated impacts included the likelihood for greater habitat fragmentation, wildlife segmentation, and other impacts to the backcountry experience. These potential segments would also likely have required substantial earthwork, resulting in deeper cuts and higher fills. The remaining segments are shown in Figure 2-6 as the preliminary study alternatives. The partial-build and build preliminary study alternatives were analyzed as entire corridors rather than by individual segment.

## **2.2 Description of Preliminary Study Alternatives**

After consideration of approximately 100 initial options and a number of potential roadway alignments, nine preliminary study alternatives were developed. They are described below and include: No-Action, Monetary Settlement, Laurel Branch Picnic Area, Bushnell Area (since referred to as the Partial-Build Alternative to Bushnell), Buckeye Branch Bridge Corridor, Cable Cove Bridge Corridor, Northern Shore Corridor, Interior Corridor, and Flint Gap Corridor. For purposes of describing some of the alternatives,

reference is made to the Northern Shore Corridor. The Northern Shore Corridor is the most east-west corridor, and segments of many of the other corridors, both partial-build and build alternatives, utilize the same path. Since it is the most common link among the alternatives, it is used as a basis for describing the other corridors (Figure 2-6). The lengths noted in Section 2.2.3 and Appendix C (Preliminary Alternatives Comparison Matrix, as discussed in Section 2.3.1) are approximate and based on the centerline of the preliminary study corridors.

NPS provides annual ferry service for cemetery access on a scheduled basis for the public. Eleven trips are made to visit 20 cemeteries along the northern shore of Fontana Lake each year. The annual ferry service would continue if:

- an alternative does not include provisions for a new road,
- a partial-build or build alternative does not intersect an administrative road, or
- a partial-build or build alternative only reaches a portion of the cemeteries.

If a partial-build or build alternative intersects a maintained GSMNP administrative road, the public would be allowed access to the administrative road on a scheduled basis for cemetery visitation. Transportation would be provided by NPS or personal vehicle, depending on the condition of the road.

### **2.2.1 No-Action**

The No-Action Alternative would forego any improvements to Lake View Road with the exception of routine maintenance. Under this alternative, there would be no changes to the existing conditions within the study area. No compensation would be provided in lieu of building the road. NPS would continue to provide transportation across Fontana Lake for annual cemetery visits and would maintain current amenities, policies, and practices of GSMNP.

NEPA requires a No-Action Alternative. Because the No-Action Alternative would avoid any adverse environmental impacts, it provides a basis for comparing the potential impacts and benefits of the partial-build and build alternatives.

### **2.2.2 Monetary Settlement**

The Monetary Settlement Alternative would provide monetary compensation to Swain County. No additional roadway would be constructed. NPS would continue to provide transportation across Fontana Lake for annual cemetery visits and would continue current amenities, policies, and practices of GSMNP.

The Swain County Commissioners passed a resolution on February 11, 2003 that stated the county would accept a monetary settlement of \$52 million to settle the 1943 Agreement. Bryson City passed a similar resolution on March 3, 2003. Copies of these resolutions are included in Appendix D. The amount of \$52 million was assumed for analysis purposes in Section 4.2.3.

## **2.2.3 Partial-Build Corridors**

### **2.2.3.1 Laurel Branch Picnic Area (Initial Concept)**

The Laurel Branch Picnic Area would include a day-use area just prior to the existing tunnel. Lake View Road would end at the existing parking area east of the tunnel. A new, two-way, paved entrance/exit road near the parking area would provide access from Lake View Road to the picnic area. Outdoor facilities would include covered picnic tables, an interpretive trail, drinking fountains, and restrooms. Section 2.5.3 of this report details the refined concept for this alternative.

### **2.2.3.2 Bushnell Area (Initial Concept)**

This alternative would follow the Northern Shore Corridor to the vicinity of Monteith Branch and provides a new destination that would offer some type of visitor services, a tribute to local heritage, and educational opportunities. This corridor would require a major bridge crossing of the Forney Creek embayment. The total length of this corridor is 4.7 miles (7.6 km). Section 2.5.4 of this report details the refined concept for this alternative.

### **2.2.3.3 Buckeye Branch Bridge Corridor**

The Buckeye Branch Bridge Corridor would follow the Northern Shore Corridor roughly 4.9 miles (7.9 km) to just east of the Chambers Creek embayment. At this point, it would continue south to southwest toward Fontana Lake. After bridging the lake, the corridor would tie into Meetinghouse Mountain Road south of the lake in the Nantahala National Forest. The corridor would follow this road to NC 28. This corridor would involve approximately 7 miles (11.3 km) of new construction within GSMNP, in addition to approximately 5.4 miles (8.7 km) of improvements to Meetinghouse Mountain Road in the Nantahala National Forest.

### **2.2.3.4 Cable Cove Bridge Corridor**

The Cable Cove Bridge Corridor would follow the Northern Shore Corridor to just east of Hazel Creek. At this point, the corridor would cross Fontana Lake, tying into Cable Cove Road west of the Cable Cove Recreation Area. Cable Cove Road is on Nantahala National Forest lands and has an existing intersection with NC 28. Improvements to Cable Cove Road would be necessary with this corridor. The total length of this corridor is 21.4 miles (34.4 km), approximately 19 miles (30.6 km) of which are within GSMNP.

## **2.2.4 Build Corridors**

The following build corridors noted in Sections 2.2.4.1 through 2.2.4.3 below have two options for the western terminus, both in the vicinity of the Fontana Dam. One of the options would tie the proposed corridor directly into the existing GSMNP roadway segment that crosses Fontana Dam, while the other would follow a short portion of an old roadbed to tie directly into NC 28. The connection closest to Fontana Dam would have less roadway construction (roughly 1.5 miles [2.4 km]) as compared with the other terminus. However, introducing additional vehicles over Fontana Dam may generate security concerns and would have the potential to increase the structure's maintenance costs.

#### **2.2.4.1 Northern Shore Corridor**

The Northern Shore Corridor continues west past the Lake View Road tunnel on a course that generally follows the northern shore of Fontana Lake to the vicinity of Fontana Dam, for a total of roughly 27 miles<sup>2</sup> (43.5 km). This corridor utilizes remaining portions of NC 288 to the extent possible. Major bridge crossings of the Forney Creek, Hazel Creek, and Eagle Creek embayments would be necessary.

#### **2.2.4.2 Interior Corridor**

The Interior Corridor turns to the north from the Lake View Road tunnel to follow Bear Creek Valley as it continues into the interior of GSMNP. After its climb levels off, the corridor follows the mountainside. Just east of Hazel Creek, the corridor turns south to tie into the Northern Shore Corridor in the vicinity of the confluence of the Hazel Creek embayment and Fontana Lake. Major bridge crossings of the Hazel Creek and Eagle Creek embayments would be required. This route continues to follow the Northern Shore Corridor to the vicinity of Fontana Dam. A tunnel would be required where the topography transitions from valley to mountainside. This corridor is roughly 26 miles (41.8 km) long.

#### **2.2.4.3 Flint Gap Corridor**

The Flint Gap Corridor would follow the Northern Shore Corridor from the Lake View Road tunnel for roughly 16 miles (25.7 km) to just east of Hazel Creek. From here, it would continue north to northwest toward the interior of GSMNP. Just west of Eagle Creek, the corridor would turn south to tie into the Northern Shore Corridor in the vicinity of the confluence of the Eagle Creek embayment and Fontana Lake. This route would continue to follow the Northern Shore Corridor to the vicinity of Fontana Dam. This corridor is the longest of the preliminary study alternatives, with a total length of roughly 34 miles (54.7 km).

### **2.2.5 Potential for Major Bridges**

The partial-build and build alternatives have the potential to cross one or more very deep and wide bodies of water. Fontana Dam created a reservoir that is in excess of 200 feet (61 m) deep. This area includes Fontana Lake as well as the impounded waters of major creeks, such as Forney, Hazel and Eagle creeks. It is anticipated that crossings of these waterbodies would have spans ranging from 1,500 to 3,000 feet in length. Bridge substructure height (water depth plus height above water) could range from 300 to 600 feet (91.4 to 182.9 m). Preliminary consideration of major bridge crossings indicates the need for non-conventional structures.

Non-conventional structures are able to accommodate the expected combination of relatively long spans and high substructure support columns related to the deep water levels and the height above water. These types of structures would allow potential roadway designs to follow the existing topography more closely at major creek and lake crossings. This ability to more closely follow the topography would minimize impacts by eliminating or reducing the need for steep cuts (reducing excavation) and would potentially reduce the quantity and area of retaining walls that may be required.

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<sup>2</sup> Length is approximate and based on the centerline of the preliminary study corridor. However, functional designs provide more refined detail, which is reflected in the updated lengths provided in Section 2.5

There are several options for designing non-conventional structures, including steel-arch bridges and cable-stayed bridges. These structures are typically large, which may impact visual resources within the existing environment. To minimize these impacts, special application and visualization techniques may be applied to create a more aesthetically sound structure that blends with the existing landscape. If a partial-build or build alternative requires a major bridge, the most appropriate and sensitive method would be utilized in the design. Opportunities to reduce bridge size may exist using a longer roadway, lower design speeds, or incorporating specialized engineering techniques that are appropriate for sensitive areas.

## **2.3 Framework for Decision-making: Summary of Potential Impacts**

### **2.3.1 Comparison Matrix**

The nine preliminary study alternatives were examined using the Preliminary Alternatives Comparison Matrix shown in Appendix C. The matrix evaluated the preliminary study alternatives based on a list of variables that includes environmental, social, economic, and engineering constraints, and on documented existing conditions data. The results of this initial review led to the elimination of two, modification of one, and the continued study of six preliminary study alternatives for more detailed evaluation.

The quantities shown in the matrix were an approximation of known data within the 2,000-foot-wide (609.6-m-wide) study corridors for each preliminary study alternative and do not equate to impacts. These approximations were based on data obtained for the January 2004 *Existing Conditions Report* (ECR). Benefits and/or impacts for the Monetary Settlement Alternative were not addressed with regard to what Swain County would do with the money. The county could choose to spend the money in ways that result in impacts and/or benefits to environmental (human and natural) and cultural resources. These potential benefits and/or impacts were not taken into account in the matrix, as they are unknown.

### **2.3.2 Alternatives Eliminated from Further Study**

Three of the nine preliminary study alternatives were suggested for elimination from further study based on the matrix. The suggestions were made by comparing the alternatives, and those that were likely to have higher impacts were suggested for elimination. In addition, those alternatives that appeared to offer little benefit to the study area were also suggested for elimination. The three alternatives suggested for elimination are the Buckeye Branch Bridge Corridor, the Interior Corridor, and the Flint Gap Corridor. Reasons for elimination are discussed in Sections 2.3.2.1, 2.3.2.2, and 2.3.2.3.

#### **2.3.2.1 Buckeye Branch Bridge Corridor**

When compared with the other preliminary study alternatives, this corridor would have minimal benefits for local communities and GSMNP visitors. Benefits associated with this alternative would include a short segment of new vehicular access within GSMNP and a new connection between GSMNP and the Nantahala National Forest. These benefits were not expected to justify the cost and environmental impacts associated with the corridor and a major bridge crossing of Fontana Lake. This alternative was recommended for elimination because it would likely provide few enhancement opportunities to the GSMNP experience and likely would not satisfy the 1943 Agreement.