

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.

### **2.3.2.2 Interior Corridor**

When compared with the other corridors, the Interior Corridor would likely have a high potential to fragment habitat, impact wildlife, and alter the backcountry experience. While problematic rock formations are located throughout the study area, this corridor would involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. An alternative in this corridor may generate moderate increases in the number of visitors to the study area, and the new access in GSMNP may indirectly provide moderate economic development opportunities in Bryson City and other communities in the study area. This corridor would have the potential to have major impacts to the AT. Although this corridor complies with the original intent of the 1943 Agreement, the cumulative impact of the factors mentioned above were expected to be greater than those of the alternatives recommended for detailed study. Therefore, this corridor was recommended for elimination.

### **2.3.2.3 Flint Gap Corridor**

The Flint Gap Corridor, when compared with the other corridors, would likely have a high potential to fragment habitat, impact wildlife, and alter the backcountry experience. In addition, this corridor would likely impact a high number of potential cultural resource sites and streams. While problematic rock formations are located throughout the study area, this corridor would involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. This corridor may generate moderate increases in the number of visitors to the study area and may indirectly provide moderate economic development opportunities in Bryson City and other communities in the study area. This corridor would have the potential to have major impacts to the AT. This corridor would avoid major bridge crossings at the Hazel Creek and Eagle Creek embayments by diverting north from the Northern Shore Corridor toward the interior of GSMNP. While this corridor would comply with the original intent of the 1943 Agreement, the Flint Gap Corridor was initially recommended for elimination because of the impacts mentioned above. (Note: Based on public interest, this corridor was modified and incorporated into the Northern Shore Corridor for detailed study. The modification of the Flint Gap Corridor (since referred to as the Proctor option and as part of the Northern Shore Corridor baseline) addressed public requests to avoid major bridge crossings and provide access to the former community of Proctor. The modifications are explained in more detail in Section 2.4.3.).

### **2.3.3 Alternatives Initially Suggested for Detailed Study in the DEIS**

Six alternatives were initially suggested for detailed study in the Draft Environmental Impact Statement (DEIS) and presented to the public and resource agencies for review and comment. Information on why these alternatives were suggested for detailed study is included below. Four of the six alternatives suggested for detailed study are partial-build or build corridors. The remaining two alternatives are the No-Action Alternative and the Monetary Settlement Alternative. Figure 2-7 shows the partial-build and build alternatives that were initially suggested for detailed study in the DEIS.

### **2.3.3.1 No-Action Alternative**

NEPA requires the No-Action Alternative as a basis for comparing the potential benefits and impacts of other alternatives. This alternative would avoid disturbance and adverse impacts to cultural and natural resources.

### **2.3.3.2 Monetary Settlement**

Based on the Swain County Board of Commissioners Resolution, the Monetary Settlement may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study because it would avoid disturbance and other adverse impacts to the existing natural environment, cultural resources, and recreational resources (including GSMNP, the AT, and the Nantahala National Forest). It would also provide Swain County with a monetary benefit. Swain County may choose to pursue economic development opportunities within the county's jurisdiction, which would potentially enhance public facilities, employment opportunities, and/or the local tourism industry. This alternative does not directly provide new opportunities to interpret local heritage within GSMNP, but Swain County may choose to pursue interpretive possibilities for local heritage within the county's jurisdiction.

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

Although the Laurel Branch Picnic Area (proposed to be located along or at the end of the existing section of Lake View Road) does not comply with the original intent of the 1943 Agreement, it may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study because it would provide a new destination and additional opportunities to interpret local heritage with relatively few impacts to the natural environment and almost no impact to the GSMNP backcountry experience. This alternative would avoid disturbance and other adverse impacts to the AT and the Nantahala National Forest. The new facilities would likely attract visitors to the Bryson City entrance of GSMNP. The interpretive trail would provide an opportunity to explore stream ecology along Laurel Branch, while roadside signs would provide a tribute to local heritage. In addition, this alternative may indirectly provide minor economic development opportunities for Bryson City. Section 2.5.3 of this report details the refined concept for this alternative.

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

Based on public comment, the Bushnell Area may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study because it would provide a new destination and new vehicular access within GSMNP with relatively low potential impacts to the natural environment and the GSMNP backcountry experience as compared with the other preliminary study alternatives. This alternative would avoid disturbance and other adverse impacts to the AT and the Nantahala National Forest. It would likely attract visitors to the Bryson City entrance of GSMNP, which may indirectly provide moderate economic development opportunities for Bryson City. This alternative would avoid construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. In addition, this alternative has the potential to provide access to cultural resources for interpretive opportunities and heritage recognition. Furthermore, it would offer a new trailhead for access to the backcountry. Section 2.5.4 of this report details the refined concept for this alternative.

### **2.3.3.5 Cable Cove Bridge Corridor**

The Cable Cove Bridge Corridor was suggested for detailed study because it would likely have fewer impacts than the other build alternatives and appeared to be a viable solution to settle the 1943 Agreement by providing vehicular access along most of the northern shore of Fontana Lake. This new route and connection between GSMNP and the Cable Cove Recreation Area may generate moderate increases in the number of visitors to the study area. This alternative may also have the potential to indirectly provide economic development opportunities for Bryson City and other communities in the study area. As compared with the alternatives that terminate near Fontana Dam, this alternative's crossing over Fontana Lake would avoid two other major bridge crossings (one each at the Hazel Creek and Eagle Creek embayments). While problematic rock formations are located throughout the study area, the Cable Cove Corridor would avoid construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. In addition, this alternative would avoid impacts to the AT. Overall, environmental impacts associated with this alternative are expected to be generally moderate as compared with the other preliminary study alternatives.

### **2.3.3.6 Northern Shore Corridor**

This corridor was suggested for detailed study because it would likely have fewer impacts than the two build alternatives recommended for elimination and would comply with the original intent of the 1943 Agreement by providing vehicular access along the northern shore of Fontana Lake. This new vehicular access may have the potential to indirectly provide moderate economic development opportunities for Bryson City and other communities in the study area. In addition, this alternative may generate moderate increases in the number of visitors to the study area. While problematic rock formations are located throughout the study area, the Northern Shore Corridor would likely involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. Impacts through this area would be reduced through the use of major bridge crossings at the Hazel Creek and Eagle Creek arms of Fontana Lake. As compared with corridors that are located farther north toward the interior of GSMNP, the proposed location of this corridor along the northern shore of Fontana Lake would involve topography with generally less drastic elevation changes and would reduce the potential for habitat fragmentation. The Northern Shore Corridor would have major impacts on the GSMNP backcountry experience, and its terminus near Fontana Dam would have the potential for major impacts on the AT, as compared with the other alternatives. This study corridor, relative to the other corridors, would traverse the largest amount of the water supply watershed critical area, the most wetlands (per the National Wetland Inventory [NWI]), and the largest area of floodplains (per the 100-year designations by the Federal Emergency Management Agency [FEMA]). Overall, environmental impacts associated with this alternative are expected to be generally moderate to high as compared with the other preliminary study alternatives.

## **2.4 Alternatives Refinement**

Public and agency comments and review of GSMNP visitor needs were given consideration in determining the facilities, amenities, and alternatives that were chosen for detailed study. Revisions to the initially suggested study alternatives include the following: