

### 5.19 Visual Resources

#### 5.19.1 Introduction

The elements of scenic attractiveness, landscape visibility, and scenic integrity that were used to inventory and describe visual resource conditions also provided the framework and guidelines for completing an assessment of potential impacts for the alternatives considered. Of these elements, scenic integrity is the primary element as it categorizes the important visual changes related to each alternative and ultimately indicates the extent to which existing scenic attractiveness would be affected.

#### 5.19.2 Impact Assessment Methods

For this analysis, it was assumed that minimizing exposed reservoir bottoms and shoreline ring effects resulting from lower pool levels would help maintain or enhance the positive scenic character and attractiveness of the reservoirs. The duration of views and the season in which different degrees of contrast occur were also considered when evaluating potential impacts. For example, less contrast during the primary viewing period of late spring through late fall would provide the greatest benefit to the visual resources in the project area. Based on these factors, potential impacts on visual resources were evaluated using the following criteria:

- The difference in pool level fluctuations compared to the Base Case reservoir operations;
- The number of days that reservoir level is within 3 feet of the highest median pool elevation and the period in which this occurs; and,
- The late October median pool level elevation.

The first criterion provides a framework for determining whether the overall shoreline ring effect would remain the same or be reduced in maximum contrast compared to the Base Case condition and indicates the degree to which reservoir bottoms and flats would be exposed. The second criterion indicates the duration and period in which reservoir levels would remain at an elevation that maintains the natural appearance of the shoreline and, conversely, the amount of time that the effects of lower pool levels would be evident. The third criterion provides a comparison of reservoir elevations during the fall foliage viewing period and the resulting degree of contrast that would occur during this important viewing period, when tributary reservoir levels are under unrestricted drawdown conditions.

This information was extracted from the WSM and is listed by policy alternative for each representative reservoir used in the visual resources assessment. Tables 5.19-01 through 5.19-03 provide summaries of the comparison data for each of the evaluation criteria. The data were then compared to determine the effect on visual integrity for each alternative. Results were characterized according to whether visual integrity would remain the same, be reduced, or be improved in comparison to conditions under the Base Case.

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**Table 5.19-01 Water Level Fluctuations for Representative Reservoirs by Policy Alternative**

Reservoir	Policy Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
<b>Tributary Reservoirs</b>									
Boone	26.0	26.0	26.0	26.0	21.0	26.0	26.0	26.0	20.0
Cherokee	40.1	29.9	19.7	29.2	18.7	40.3	19.7	25.0	27.1
Fontana	71.7	77.5	49.0	51.6	32.0	73.5	49.0	59.0	52.5
Tims Ford	17.5	13.0	17.0	17.0	19.1	18.0	17.0	13.0	18.0
Watagua	21.0	13.1	4.6	15.4	9.0	21.4	10.8	7.4	8.2
<b>Mainstem Reservoirs</b>									
Chickamauga	6.2	4.7	4.7	6.3	7.2	4.7	4.7	4.7	6.2
Guntersville	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Kentucky	5.3	5.3	3.0	4.7	5.3	3.0	3.0	5.3	4.7
Wheeler	4.7	3.2	3.2	4.8	4.7	3.2	3.2	3.2	4.7

Note: Values represent the difference in feet between the highest and lowest median elevation points.

Source: TVA file data.

**Table 5.19-02 Duration at High-Pool Elevations for Representative Reservoirs by Policy Alternative**

Reservoir	Policy Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
<b>Tributary Reservoirs</b>									
Boone	147	147	147	49	70	147	147	147	147
Cherokee	49	98	126	35	91	49	126	133	70
Fontana	49	84	112	28	42	49	112	133	84
Tims Ford	133	133	154	56	91	133	154	133	133
Watagua	84	140	182	126	112	84	210	203	133
<b>Mainstem Reservoirs</b>									
Chickamauga	196	210	210	105	168	203	210	210	196
Guntersville	364	364	364	364	364	364	364	364	364
Kentucky	154	189	364	126	154	364	364	189	154
Wheeler	196	364	364	133	189	364	364	364	217

Note: Values indicate the number of days that median pool levels would be within 3 feet of the highest pool elevation.

Source: TVA file data.

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Table 5.19-03 Late October Median-Pool Level for Representative Reservoirs by Policy Alternative

Reservoir	Policy Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/ Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
<b>Tributary Reservoirs</b>									
Boone	1,372.9	1,372.9	1,369.8	1,356.0	1,375.6	1,372.9	1,369.8	1,372.9	1,372.9
Cherokee	1,037.9	1,047.6	1,060.5	1,042.7	1,066.1	1,037.9	1,060.7	1,058.4	1,048.9
Fontana	1,653.3	1,658.0	1,681.7	1,652.5	1,666.4	1,652.7	1,681.6	1,684.8	1,664.3
Tims Ford	881.3	881.3	880.8	871.0	869.7	881.3	880.8	881.3	881.3
Watagua	1,940.0	1,948.6	1,955.8	1,943.3	1,953.7	1,940.0	1,946.5	1,956.5	1,951.1
<b>Mainstem Reservoirs</b>									
Chickamauga	678.5	679.4	679.3	676.0	676.4	678.5	679.3	679.4	678.7
Guntersville	593.6	593.6	593.9	593.3	593.6	593.6	593.9	593.6	593.9
Kentucky	354.7	355.6	357.1	354.3	354.7	356.0	357.1	355.6	354.7
Wheeler	552.0	553.5	553.7	551.0	551.9	552.5	553.7	553.5	552.8

Note: Values indicate elevation in feet for the median pool levels during the last week in October.

Source: TVA file data.

It is important to note that review of all the probable elevation data developed for the project confirmed that the representative reservoirs selected for this analysis are illustrative of the visual changes that would occur under each of the alternatives for all mainstem and tributary reservoirs in the TVA system. Run-of-river reservoirs were also investigated for elevation changes associated with each policy alternative. Pool elevations for these reservoirs would not change under any of the alternatives; therefore, visual integrity would not be affected.

Other qualitative measures used in the assessment of visual resources were based on indirect visual effects resulting from erosion factors, land use patterns, and development that may result from the alternatives (see Sections 4.15 and 5.15 [Land Use], and Sections 4.16 and 5.16 [Shoreline Erosion]).

### **5.19.3 Base Case**

Under the Base Case, the existing scenic integrity levels would continue to be a component of the viewed landscape. The only changes that would occur would be related to continued trends in increased residential development and the resulting impacts on shoreline aesthetics. Implementation of the guidelines identified in the SMI (TVA 1998) would help to reduce or eliminate some of the factors contributing to lower scenic integrity levels that are associated with shoreline development. Actions to reduce the effects of exposed structures or other elements that cause visual discord when pool levels are lower would increase visual integrity. Erosion factors associated with existing reservoir operations may also contribute to reduced scenic integrity, especially for mainstem reservoirs.

### **5.19.4 Reservoir Recreation Alternative A**

Reservoir Recreation Alternative A would improve the overall scenic integrity for both tributary and mainstem reservoirs. For the representative tributary reservoirs, Boone would remain the same while the others would be slightly to moderately improved. All mainstem representative reservoirs would see some level of improvement in scenic integrity, with the most noticeable changes at Chickamauga Reservoir and Wheeler Reservoir.

Changes in reservoir operations under Reservoir Recreation Alternative A would result in less overall fluctuation in pool levels, higher pool levels during the primary viewing period, higher winter levels for most reservoirs, and higher October water levels. These changes would reduce the contrast in the ring effect and the amount of exposed reservoir bottoms and flats.

Overall, Reservoir Recreation Alternative A would moderately improve visual integrity, with a resulting improvement in overall scenic attractiveness.

### **5.19.5 Reservoir Recreation Alternative B and Tailwater Recreation Alternative**

Reservoir Recreation Alternative B and the Tailwater Recreation Alternative would result in similar effects as those described for Reservoir Recreation Alternative A but would result in a higher level of improvement of scenic resources. Overall, there would be a much greater reduction in pool level fluctuations, a longer duration of pool levels at higher elevations, and

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higher October reservoir levels. Winter pool elevations also would be viewed at higher levels than under Reservoir Recreation Alternative A.

Based on direct effects, Reservoir Recreation Alternative B and the Tailwater Recreation Alternative would provide the greatest improvement of scenic integrity and overall scenic attractiveness compared to all other alternatives.

### **5.19.6 Summer Hydropower Alternative**

Although the Summer Hydropower Alternative would result in overall lower fluctuation levels for tributary reservoirs that would be similar to results under Reservoir Recreation Alternative A, the Summer Hydropower Alternative would also result in an overall reduction of the duration when pool levels are at higher elevations. This reduction would be substantial for some tributary reservoirs, such as Boone and Tims Ford. A shorter duration of higher water levels also was noted for the mainstem reservoirs when compared to the Base Case. The shorter duration would result in lower reservoir levels being observed for a longer time during the primary viewing period. It was also noted that the minimum pool levels reached under abnormal rainfall years for some of the tributary reservoirs under the Summer Hydropower Alternative would be extremely lower than those under the Base Case. Overall, late October reservoir levels would tend to be lower under the Summer Hydropower Alternative when compared to the other alternatives.

The Summer Hydropower Alternative would moderately decrease scenic integrity, with a resulting decrease in overall scenic attractiveness.

### **5.19.7 Equalized Summer/Winter Flood Risk Alternative**

Although the Equalized Summer/Winter Flood Risk Alternative would include very favorable reductions in fluctuation levels (some equal to or better than those for Reservoir Recreation Alternative B and the Tailwater Recreation Alternative), the reductions would be accomplished at the expense of overall lower maximum reservoir levels. For some tributary reservoirs (such as Fontana), maximum reservoir levels would be 21 feet lower than under Base Case operations. This modification will create a short-term year-round shoreline ring effect. Natural succession is expected to re-establish vegetation in this area. However, the affected zone would most likely require several years to be restored to a fully vegetated shoreline. The visual effects on mainstem reservoirs under the Equalized Summer/Winter Flood Risk Alternative would be similar to those under the Summer Hydropower Alternative.

The Equalized Summer/Winter Flood Risk Alternative would decrease scenic integrity, with a resulting decrease in overall scenic attractiveness.

### 5.19.8 Commercial Navigation Alternative

The Commercial Navigation Alternative is similar to the Base Case for the tributary reservoirs. There would be some improvement for mainstem reservoirs, resulting in an overall slight improvement in scenic integrity levels.

### 5.19.9 Tailwater Habitat Alternative

The Tailwater Habitat Alternative would blend many of the positive attributes of Reservoir Recreation Alternative A and Reservoir Recreation Alternative B. While the degree of fluctuation levels lies between these two alternatives, the Tailwater Habitat Alternative generally would provide the longest duration of high pool elevations of all the alternatives. Fall pool level elevations also generally would be higher.

The Tailwater Habitat Alternative would result in greatly improved scenic integrity, with a resulting increase in overall scenic attractiveness.

### 5.19.10 Preferred Alternative

The Preferred Alternative would improve the overall scenic integrity for tributary reservoirs. Visual resources at mainstem reservoirs would be similar to those under the Base Case, although scenic integrity would be slightly improved for selected reservoirs such as Wheeler.

Visual resources at all representative tributary reservoirs, except Tims Ford, would be improved in the form of less overall fluctuation in pool levels, longer duration of higher pool levels during the primary viewing period, and higher October reservoir levels. Winter levels would also be higher. Visual resources at Tims Ford would be similar to those under the Base Case. The Preferred Alternative is the only alternative that would result in less pool level fluctuation for Boone Reservoir.

Overall, the Preferred Alternative would moderately improve visual integrity, with a resulting improvement in overall scenic attractiveness.

### 5.19.11 Summary of Impacts

Table 5.19-04 provides a summary of the direct effects on scenic integrity levels for the representative reservoirs associated with each of the alternatives. Reservoir Recreation Alternative B, the Tailwater Recreation Alternative, and the Tailwater Habitat Alternative would provide the greatest degree of improvement in scenic integrity and overall scenic attractiveness. Reservoir Recreation Alternative A and the Preferred Alternative would moderately improve scenic integrity. Effects under the Commercial Navigation Alternative would be similar to those under the Base Case. The Summer Hydropower Alternative and Equalized Summer/Winter Flood Risk Alternative would reduce scenic integrity.

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**Table 5.19-04 Summary of Impacts on Scenic Integrity by Policy Alternative**

Alternative	Description of Impacts
Base Case	No change – Current scenic integrity levels would continue to be a component of the viewed landscape. The only changes that would occur would be related to continued trends in increased residential development and the resulting impacts on shoreline aesthetics. Erosion factors associated with current reservoir operations may also contribute to additional reduction in scenic integrity.
Reservoir Recreation A	Beneficial – Overall scenic integrity for both tributary and mainstem reservoirs would be moderately improved with a resulting improvement in scenic attractiveness. Changes in reservoir operations would result in less overall fluctuations in pool levels, higher pool levels during the primary viewing period, higher winter levels for most reservoirs, and higher October water levels.
Reservoir Recreation B	Substantially beneficial – Overall scenic integrity for both tributary and mainstem reservoirs would be greatly improved with a resulting improvement in scenic attractiveness. Changes in reservoir operations would result in much greater reductions in pool level fluctuations, a longer duration of pool levels at higher elevations, and higher October reservoir levels. Winter pool elevations also would be viewed at higher levels.
Summer Hydropower	Adverse – Overall scenic integrity for both tributary and mainstem reservoirs would be moderately reduced, with a resulting decrease in scenic attractiveness. Overall lower fluctuation levels.  For tributary reservoirs, favorable reductions in fluctuation levels would be offset by an overall reduction of the duration when pool levels are at higher elevations. This reduction is substantial for some reservoirs. A shorter duration of higher water levels will also occur with the mainstem reservoirs.
Equalized Summer/Winter Flood Risk	Slightly adverse – Overall scenic integrity for both tributary and mainstem reservoirs would be slightly reduced with a resulting decrease in scenic attractiveness. Favorable reductions in fluctuation levels would be accomplished at the expense of overall lower maximum reservoir levels. These modifications would result in a short-term year-around shoreline ring. The affected zone would most likely take several years to be restored to a fully vegetated shoreline.
Commercial Navigation	Slightly beneficial – Overall scenic integrity would be slightly improved. There would be some improvement for mainstem reservoirs while tributary reservoirs would be similar to the Base Case.
Tailwater Recreation	Substantially beneficial – Overall scenic integrity for both tributary and mainstem reservoirs would be greatly improved with a resulting improvement in scenic attractiveness. Changes in reservoir operations would result in much greater reductions in pool level fluctuations, a longer duration of pool levels at higher elevations, and higher October reservoir levels. Winter pool elevations also would be viewed at higher levels.
Tailwater Habitat	Substantially beneficial – Overall scenic integrity for both tributary and mainstem reservoirs would be greatly improved with a resulting improvement in scenic attractiveness. Changes in reservoir operations would result in less overall fluctuations in pool levels, a much longer duration of pool levels at higher elevations, and higher October reservoir levels. Winter pool elevations also would be viewed at higher levels.
Preferred	Beneficial – Overall, scenic integrity for tributary reservoirs would be moderately improved, with a resulting improvement in scenic attractiveness. Changes in reservoir operations for tributary reservoirs would result in less overall fluctuation in pool levels, longer duration of higher pool levels, and higher October reservoir levels. Winter pool elevations would also be viewed at higher levels for the tributary reservoirs. Visual resources at mainstem reservoirs would be similar to the Base Case, with only slight improvement evident in selected reservoirs due to a slightly longer duration of higher pool levels during summer and slightly higher October pool levels.