

# **Appendix B**

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## **Reservoir Operations Study Preliminary Alternatives**



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## Appendix B Reservoir Operations Study Preliminary Alternatives

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<b>RESERVOIR OPERATIONS POLICY ALTERNATIVES EVALUATED IN DETAIL</b>	
<b>Alternative Name</b>	<b>Former Number Code</b>
Reservoir Recreation A	2A
Reservoir Recreation B	3C
Summer Hydropower	4D
Equalized Summer/Winter Flood Risk	5A
Commercial Navigation	6A
Tailwater Recreation	7C
Tailwater Habitat	8A

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**Preliminary Alternative 1A**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify summer reservoir elevations and/or drawdown dates</p>	<ul style="list-style-type: none"> <li>• Maintain reservoir elevations at or above current August 1 levels through Labor Day for South Holston, Watauga, Cherokee, Douglas, Fontana, Chatuge, Nottely, Hiwassee, Blue Ridge, and Norris.</li> <li>• For Great Falls—Revise the operating guide curve to fill the reservoir by June 1 and maintain summer elevations through Labor Day.</li> <li>• No changes to the following reservoirs for the reasons described:               <ul style="list-style-type: none"> <li>▶ Wilbur—run-of-river project.</li> <li>▶ Boone—maintains summer elevation through Labor Day.</li> <li>▶ Fort Patrick Henry—run-of-river project.</li> <li>▶ Apalachia—run-of-river project.</li> <li>▶ Ocoee #1—maintains summer elevation through November 1.</li> <li>▶ Melton Hill—run-of-river project.</li> <li>▶ Tims Ford—maintains summer elevation through mid-October.</li> <li>▶ Upper Bear Creek—maintains the same fluctuation range year round.</li> <li>▶ Bear Creek—maintains summer elevation to mid-November.</li> <li>▶ Little Bear Creek—maintains summer elevation through November 1.</li> <li>▶ Cedar Creek—maintains summer elevation through November 1.</li> </ul> </li> <li>• Normandy—guide curve stays at summer elevation through mid-October, however; this elevation is subject to meeting downstream minimum flows and usually falls throughout the summer.</li> </ul>	<ul style="list-style-type: none"> <li>• Extend the current summer elevation through August 1 for Watts Bar, Chickamauga, Guntersville, Wheeler, Pickwick, and Kentucky/Barkley.</li> <li>• Then slope the guide curve from August 1 through Labor Day by 1 foot for each reservoir.</li> <li>• After Labor Day, slope the new curve to meet the current curve.</li> <li>• No changes to the following reservoirs for the reasons described:               <ul style="list-style-type: none"> <li>▶ Fort Loudoun—maintains summer elevation through November 1.</li> <li>▶ Nickajack—run-of-river project.</li> <li>▶ Wilson—maintains summer elevation through December 1.</li> </ul> </li> </ul>

## Preliminary Alternative 1A (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>Slower flood recovery; extend the current 7- to 10-day flood recovery policy to 14 to 20 days when warranted (except for Hiwassee).</li> <li>Raise Cherokee and Nottely minimum operations guide based on revised observed inflows.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>No change in water releases associated with producing power and increasing flood storage capacity.</li> <li>Same as Base Case minimum flow commitments.</li> <li>No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>No change in water releases associated with producing power and increasing flood storage capacity.</li> <li>Same as Base Case minimum flow commitments, except for increasing weekly average release from Chickamauga to 25,000 cfs between August 1 and Labor Day.</li> </ul>

cfs = Cubic feet per second.

**Preliminary Alternative 2A**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify summer reservoir elevations and/or drawdown dates</p>	<ul style="list-style-type: none"> <li>• Maintain reservoir elevations at or above current August 1 levels until Labor Day for South Holston, Watauga, Cherokee, Douglas, Fontana, Chatuge, Nottely, Hiwassee, Blue Ridge, and Norris.</li> <li>• For Great Falls—Revise the operating guide curve to fill the reservoir by June 1 and maintain summer elevations through Labor Day.</li> <li>• No changes to the following reservoirs for the reasons described:               <ul style="list-style-type: none"> <li>▶ Wilbur—run-of-river project.</li> <li>▶ Boone—maintains summer elevation through Labor Day.</li> <li>▶ Fort Patrick Henry—run-of-river project.</li> <li>▶ Apalachia—run-of-river project.</li> <li>▶ Ocoee #1—maintains summer elevation through November 1.</li> <li>▶ Melton Hill—run-of-river project.</li> <li>▶ Tims Ford—maintains summer elevation through mid-October.</li> <li>▶ Upper Bear Creek—maintains the same fluctuation range year round.</li> <li>▶ Bear Creek—maintains summer elevation to mid-November.</li> <li>▶ Little Bear Creek—maintains summer elevation through November 1.</li> <li>▶ Cedar Creek—maintains summer elevation through November 1.</li> <li>▶ Normandy—guide curve stays at summer elevation through mid-October; however, this elevation is subject to meeting downstream minimum flows and usually falls throughout the summer.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Extend the current summer elevation through August 1 for Watts Bar, Chickamauga, Guntersville, Wheeler, Pickwick, and Kentucky/Barkley.</li> <li>• Then slope the guide curve from August 1 through Labor Day by 1 foot for each reservoir.</li> <li>• After Labor Day, slope the new curve to meet the current curve.</li> <li>• No changes to the following reservoirs for the reasons described:               <ul style="list-style-type: none"> <li>▶ Fort Loudoun—maintains summer elevation through November 1.</li> <li>▶ Nickajack—run-of-river project.</li> <li>▶ Wilson—maintains summer elevation through December 1.</li> </ul> </li> </ul>

## Preliminary Alternative 2A (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>• Raise the winter flood guides equal to the current March 15 flood guide elevations for South Holston, Watauga, Cherokee (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Douglas, Chatuge, Nottely (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Hiwassee, Blue Ridge, Norris, and Tims Ford.</li> <li>• No change to spring fill dates.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise the minimum winter elevation by 2 feet to create a 13-foot navigation channel (11 feet with 2 feet overdraft) on Fort Loudoun, Watts Bar, Chickamauga, Wheeler, and Pickwick.</li> <li>• Modify the winter operating range of these reservoirs to allow only 1 foot of fluctuation versus the current 2 feet of fluctuation allowed.</li> <li>• No change to spring fill dates.</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>• Slower flood recovery; extend the current 7- to 10-day flood recovery policy to 14 to 20 days when warranted (except for Hiwassee).</li> <li>• Raise Cherokee and Nottely minimum operating guide based on revised observed inflows.</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flows during June and July, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments.</li> <li>• No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flows during June and July, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments except for increasing weekly average release from Chickamauga to 25,000 cfs between August 1 and Labor Day.</li> <li>• No change in release below Watts Bar for Sauger spawn.</li> </ul>

cfs = Cubic feet per second.



**Preliminary Alternatives 3A, 3B, and 3C**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1. After that, release only Base Case minimum flows, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert, to arrive at or above current August 1 levels on:               <ul style="list-style-type: none"> <li>▶ November 1, if possible, for Alternative 3A;</li> <li>▶ October 1, if possible, for Alternative 3B; and,</li> <li>▶ Labor Day, if possible, for Alternative 3C.</li> </ul> </li> <li>• If August 1 levels on November 1 (3A), October 1 (3B), and Labor Day (3C) are not possible, state the elevation for these dates that has 90 percent reliability with releasing Base Case minimum flows only.</li> </ul>	<ul style="list-style-type: none"> <li>• Hold full summer pool levels until:               <ul style="list-style-type: none"> <li>▶ November 1 for Alternative 3A;</li> <li>▶ October 1 for Alternative 3B; and,</li> <li>▶ Labor Day for Alternative 3C.</li> </ul> </li> <li>• Current drawdown dates that are later than those specified for each alternative would not be moved to the earlier date.</li> </ul>
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>• Increase winter levels based on being able to store in each reservoir an inflow volume equal to the 7-day, 500-year storm.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise the minimum winter elevation by 2 feet to create a 13-foot navigation channel (11 feet with 2 feet overdraft) on Fort Loudoun, Watts Bar, Chickamauga, Wheeler, and Pickwick.</li> <li>• Modify the winter operating range of these reservoirs to allow only 1 foot of fluctuation versus the current 2 feet of fluctuation allowed.</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>• No change. If delaying unrestricted drawdown to November 1 (3A), October 1 (3B), or Labor Day (3C) prohibits meeting dam safety limits on the maximum allowable drawdown rate, the date would be adjusted accordingly.</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>

## Preliminary Alternatives 3A, 3B, and 3C (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify water releases	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flows between June 1 and November 1 for Alternative 3A, October 1 for Alternative 3B, or Labor Day for Alternative 3C, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments.</li> <li>• No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flows between June 1 and November 1 for Alternative 3A, October 1 for Alternative 3B, or Labor Day for Alternative 3C, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments.</li> </ul>

cfs = Cubic feet per second.

**Preliminary Alternatives 4A, 4B, 4C, 4D, 4E, and 4F**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>• Fill reservoirs to current full summer pool levels by June 1.</li> <li>• After that, unrestricted drawdown begins immediately to maximize power production and flood storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Fill reservoirs to current full summer pool levels by June 1.</li> <li>• Begin drawdown on June 1 to maximize power production.</li> </ul>
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>• Increase winter levels based on being able to store in each reservoir an inflow volume equal to the 7-day, 500-year storm.</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>• Unrestricted drawdown begins on June 1.</li> </ul>	<ul style="list-style-type: none"> <li>• Unrestricted drawdown begins on June 1.</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>• Maximize summer water releases to increase power production.</li> <li>• No tailwater recreation releases except for Ocoee #2.</li> <li>• Same as Base Case minimum flow commitments.</li> </ul>	<ul style="list-style-type: none"> <li>• Maximize summer water releases to increase power production.</li> <li>• Alternatives 4A through 4F—same as Base Case minimum flow commitments except for increasing weekly average release from Chickamauga between June 1 and September 15 as follows:               <ul style="list-style-type: none"> <li>▶ Alternative 4A – 20,000 cfs</li> <li>▶ Alternative 4B – 25,000 cfs</li> <li>▶ Alternative 4C – 30,000 cfs</li> <li>▶ Alternative 4D – 35,000 cfs</li> <li>▶ Alternative 4E – 40,000 cfs</li> <li>▶ Alternative 4F – 45,000 cfs (turbine capacity at Chickamauga)</li> </ul> </li> </ul>

cfs = Cubic feet per second.

## Preliminary Alternative 5A

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>Establish year-round flood guides at a level that is based on each reservoir being able to store, at a minimum, its inflow volume for the critical-period, 500-year storm.</li> </ul>	<ul style="list-style-type: none"> <li>Set elevations on the upper mainstem reservoirs (Fort Loudoun, Watts Bar, and Chickamauga) to hold a volume equal to the critical-period, 500-year storm inflow with a 30-foot flood stage release at Chattanooga. Reshape lower mainstem reservoir guide curves, except Kentucky, based on those for upper mainstem reservoirs. Hold Kentucky summer elevation only to Labor Day.</li> </ul>
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>Establish year-round flood guides at a level that is based on each reservoir being able to store, at a minimum, its inflow volume for the critical-period, 500-year storm.</li> </ul>	<ul style="list-style-type: none"> <li>Set elevations on the upper mainstem reservoirs (Fort Loudoun, Watts Bar, and Chickamauga) to hold a volume equal to the critical-period, 500-year storm inflow with a 30-foot flood stage release at Chattanooga. Reshape lower mainstem reservoir guide curves, except Kentucky, based on those for upper mainstem reservoirs. In March, however, take only as low as their current minimum elevation.</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>Perform water releases to “equalize” seasonal flood risk.</li> <li>Release only Base Case minimum flows during June and July, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>Same as Base Case minimum flow commitments.</li> <li>No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>Perform water releases to “equalize” seasonal flood risk.</li> <li>Release only Base Case minimum flows during June and July unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>Same as Base Case minimum flow commitments except for increasing weekly average release from Chickamauga to 25,000 cfs between August 1 and Labor Day.</li> </ul>

cfs = Cubic feet per second.

**Preliminary Alternatives 6A and 6B**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>Alternative 6A—same as Base Case.</li> <li>Alternative 6B—same as Base Case.</li> </ul>
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>Alternative 6A—raise winter elevations by 2 feet to create 13-foot navigation channel, where possible (11 feet with 2-foot overdraft).</li> <li>Alternative 6A— Modify the winter operating range of these reservoirs to allow 1 foot of typical operating range versus the current 2 foot operating range.</li> <li>Alternative 6B—lower winter elevations to 9 feet (no overdraft) except on Wheeler and Guntersville.</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>Same as Base Case minimum flow commitments.</li> <li>No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>Alternative 6A—same as Base Case flow commitments except for:                             <ul style="list-style-type: none"> <li>Release continuous minimum instantaneous flows of 25,000 cfs from Kentucky.</li> <li>Release maximum flow of 28,000 cfs below Barkley.</li> <li>Release continuous minimum instantaneous flows of 18,000 cfs from Pickwick during the winter when Kentucky elevation is less than or equal to 357 (weeks 1-15 and 34-52).</li> <li>Release continuous minimum instantaneous flows of 18,000 cfs from Wilson during the winter when Pickwick elevation is less than or equal to 411 (weeks 1-12 and 39-52).</li> </ul> </li> <li>Alternative 6B—same as Base Case flow commitments.</li> </ul>

## Preliminary Alternatives 7A, 7B, and 7C

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1. After that, release only Base Case minimum flows AND tailwater recreation flows, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert, to arrive at or above current August 1 levels on:               <ul style="list-style-type: none"> <li>▶ November 1, if possible, for Alternative 7A;</li> <li>▶ October 1, if possible, for Alternative 7B; and,</li> <li>▶ Labor Day, if possible, for Alternative 7C.</li> </ul> </li> <li>• If August 1 levels on November 1 (7A), October 1 (7B), and Labor Day (7C) are not possible, state the elevation for these dates that has 90 percent reliability with releasing Base Case minimum flows only AND tailwater recreation flows.</li> </ul>	<ul style="list-style-type: none"> <li>• Hold full summer pool levels until:               <ul style="list-style-type: none"> <li>▶ November 1 for Alternative 7A;</li> <li>▶ October 1 for Alternative 7B; and,</li> <li>▶ Labor Day for Alternative 7C.</li> </ul> </li> <li>• Current drawdown dates that are later than those specified for each alternative would not be moved to the earlier date.</li> </ul>
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>• Increase winter levels based on being able to store in each reservoir an inflow volume equal to its 7-day, 500-year storm.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise the minimum winter elevation by 2 feet to create a 13-foot navigation channel (11 feet with 2 feet overdraft) on Fort Loudoun, Watts Bar, Chickamauga, Wheeler, and Pickwick.</li> <li>• Modify the winter operating range of these reservoirs to allow only 1 foot of fluctuation versus the current 2 feet of fluctuation allowed.</li> </ul>
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>• No change. If delaying unrestricted drawdown to November 1 prohibits meeting dam safety limits on the maximum allowable drawdown rate, date will be adjusted accordingly.</li> </ul>	No change
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>

**Preliminary Alternatives 7A, 7B, and 7C (continued)**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify water releases	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flows and tailwater recreation flows between June 1 and November 1 for Alternative 7A, October 1 for Alternative 7B, or Labor Day for Alternative 7C, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments.</li> </ul>	<ul style="list-style-type: none"> <li>• Release only Base Case minimum flow commitments and tailwater recreation flows between June 1 and November 1 for Alternative 7A, October 1 for Alternative 7B, or Labor Day for Alternative 7C, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>• Same as Base Case minimum flow commitments.</li> </ul>
Modify tailwater recreation releases	<ul style="list-style-type: none"> <li>• Norris—provide flows year round on Saturday and Sunday               <ul style="list-style-type: none"> <li>▶ No release prior to 10:00 a.m.</li> <li>▶ Two-unit use for 8 hours.</li> </ul> </li> <li>• Watauga—provide flows from April 1 to November 1, 7 days per week               <ul style="list-style-type: none"> <li>▶ Two-unit use for 4 hours.</li> <li>▶ One-unit use for 2 hours.</li> </ul> </li> <li>• Apalachia—provide flows from April 1 to November 1, 7 days per week               <ul style="list-style-type: none"> <li>▶ Minimum flow of 200 cfs until 9:00 a.m.</li> <li>▶ One-unit use from 9:00 to 10:00 a.m.</li> <li>▶ Two-unit use for 8 hours.</li> </ul> </li> <li>• Ocoee #1—provide flows from Memorial Day to September 30, 7 days per week               <ul style="list-style-type: none"> <li>▶ Minimum flow until 10:00 a.m.</li> <li>▶ Two-unit use for 6 hours (1,000 cfs).</li> </ul> </li> <li>• Ocoee #2—no change.</li> <li>• Ocoee #3—no change.</li> <li>• Melton Hill—zero flow one weekend per month, from April 1 to November 1.</li> <li>• Great Falls—no change.</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>

## Preliminary Alternatives 7A, 7B, and 7C (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
	<ul style="list-style-type: none"><li>• Tims Ford—no change.</li><li>• Blue Ridge—no change.</li><li>• Upper Bear—no change.</li><li>• South Holston—provide continuous minimum flows of 180 cfs below the weir from March 15 to October 15, 7 days per week.</li></ul>	

cfs = Cubic feet per second.



**Preliminary Alternatives 8A, 8B, and 8C**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify summer reservoir elevations and/or drawdown dates</p>	<ul style="list-style-type: none"> <li>• No minimum operating guide, target minimum elevations, or annual drawdown schedule. Flood guides would be set the same as for Alternative 2A.</li> <li>• Reservoir elevations would be determined by retaining a percentage of inflows listed below, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides, to meet Base Case minimum flow commitments, or to support special operations during a power system alert:                             <ul style="list-style-type: none"> <li>▶ Alternative 8A—retain 75 percent of inflows.</li> <li>▶ Alternative 8B—retain 50 percent of inflows.</li> <li>▶ Alternative 8C—retain 25 percent of inflows.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No minimum operating guide, target minimum elevations, or annual drawdown schedule. The same guide curves as described for Alternative 2A would be used.</li> <li>• Reservoir elevations would be determined by retaining a percentage of inflows listed below, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides, to meet Base Case minimum flow commitments, or to support special operations during a power system alert:                             <ul style="list-style-type: none"> <li>▶ Alternative 8A—retain 75 percent of inflows.</li> <li>▶ Alternative 8B—retain 50 percent of inflows.</li> <li>▶ Alternative 8C—retain 25 percent of inflows.</li> </ul> </li> </ul>
<p>Modify winter reservoir elevations and/or fill dates</p>	<ul style="list-style-type: none"> <li>• No minimum operating guide, target minimum elevations, or annual fill schedule. Flood guides would be set the same as for Alternative 2A.</li> <li>• Pass the releases listed below, unless additional releases are necessary to stay below the flood guide, meet Base Case minimum flow commitments, or to support special operations during a power system alert.                             <ul style="list-style-type: none"> <li>▶ Alternative 8A—pass 25 percent of inflows.</li> <li>▶ Alternative 8B—pass 50 percent of inflows.</li> <li>▶ Alternative 8C—pass 75 percent of inflows.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No minimum operating guide, target minimum elevations, or annual fill schedule. The same guide curves as described for Alternative 2A would be used.</li> <li>• Pass the releases listed below, unless additional releases are necessary to stay below the flood guide, to meet Base Case minimum flow commitments, or to support special operations during a power system alert.                             <ul style="list-style-type: none"> <li>▶ Alternative 8A—pass 25 percent of inflows.</li> <li>▶ Alternative 8B—pass 50 percent of inflows.</li> <li>▶ Alternative 8C—pass 75 percent of inflows.</li> </ul> </li> </ul>
<p>Modify drawdown restrictions</p>	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>
<p>Modify rate of flood storage recovery</p>	<ul style="list-style-type: none"> <li>• No change</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>

## Preliminary Alternatives 8A, 8B, and 8C (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify water releases	<ul style="list-style-type: none"> <li>• High inflows—release water from reservoirs as necessary to keep elevations below the flood guide.</li> <li>• Low inflows—release water from reservoirs as necessary to meet Base Case minimum flow commitments.</li> <li>• When elevations are below the flood guide and minimum flows are being met, pass inflows as specified above.</li> <li>• No peaking will be performed unless low flow dips below the minimum amount required to operate one unit. Then peaking will be performed only to the extent necessary to peak one unit at the most efficient load.</li> </ul>	<ul style="list-style-type: none"> <li>• High inflows—release water from reservoirs as necessary to keep elevations below the flood guide.</li> <li>• Low inflows—release water from reservoirs as necessary to meet Base Case minimum flow commitments.</li> <li>• When elevations are below the flood guide and minimum flows are being met, pass inflows as specified above.</li> <li>• No peaking will be performed unless low flow dips below the minimum amount required to operate one unit. Then peaking will be performed only to the extent necessary to peak one unit at the most efficient load.</li> </ul>

cfs = Cubic feet per second.

**Preliminary Alternatives 9A, 9B, 9C**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify summer reservoir elevations and/or drawdown dates</p>	<ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1. After that, discretionary water is still available after the following flows have been met and water remains in the reservoirs:                             <ul style="list-style-type: none"> <li>▶ Base Case minimum flows.</li> <li>▶ 25,000 cfs from Chickamauga (from August through Labor Day).</li> <li>▶ Alternative 9A—pass 25 percent of inflow (like Alternative 8A, but peaking flows would be allowed) with 20 hours of peaking guaranteed per week from June 1 to September 15 and from December through February.</li> <li>▶ Alternative 9B—pass 25 percent of inflow (like Alternative 8A, but peaking flows would be allowed) with 40 hours of peaking guaranteed per week from June 1 to September 15 and from December through February.</li> <li>▶ Alternative 9C—pass 50 percent of inflow (like Alternative 8B, but peaking flows would be allowed) with 40 hours of peaking guaranteed per week from June 1 to September 15 and from December through February.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Extend the current summer elevation through August 1 for Watts Bar, Chickamauga, Guntersville, Wheeler, Pickwick, and Kentucky/Barkley.</li> <li>• Then slope the guide curve from August 1 through Labor Day by 1 foot for each reservoir.</li> <li>• After Labor Day, slope the new curve to meet the current curve.</li> <li>• No changes to the following reservoirs for the reasons described:                             <ul style="list-style-type: none"> <li>▶ Fort Loudoun—maintains summer elevation through November 1.</li> <li>▶ Nickajack—run-of-river project.</li> <li>▶ Wilson—maintains summer elevation through December 1.</li> </ul> </li> </ul>
<p>Modify winter reservoir elevations and/or fill dates</p>	<ul style="list-style-type: none"> <li>• Raise the winter flood guides equal to the current March 15 flood guide elevations for South Holston, Watauga, Cherokee (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Douglas, Chatuge, Nottely (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Hiwassee, Blue Ridge, Norris, and Tims Ford.</li> <li>• No change to spring fill dates.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise the minimum winter elevation to permit a 13-foot navigation channel (11 feet with 2 feet overdraft) on Fort Loudoun, Watts Bar, Chickamauga, Wheeler, and Pickwick.</li> <li>• Modify the winter operating range of these reservoirs to allow only 1 foot of fluctuation versus the current 2 feet of fluctuation allowed.</li> <li>• No change to spring fill dates.</li> </ul>

## Preliminary Alternatives 9A, 9B, 9C (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>Same as Base Case minimum flow commitments.</li> <li>No change in recreation releases below Watauga, Apalachia, Tims Ford, Ocoee #2, and Ocoee #3.</li> </ul>	<ul style="list-style-type: none"> <li>Same as Base Case minimum flow commitments.</li> </ul>

cfs = Cubic feet per second.

**Preliminary Alternative 10A**

Alternative Characteristics	Tributary Reservoirs
<p>Modify summer reservoir elevations and/or drawdown dates</p>	<ul style="list-style-type: none"> <li>• Tributary reservoirs are divided into three groups.</li> <li>• Each group is operated differently to focus on different reservoir system objectives.</li> <li>• Each reservoir group cycles through the three different types of reservoir operations over a 3-year period.</li> </ul> <p><b>Operation 1</b></p> <ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1 and hold until Labor Day.</li> <li>• Between June 1 and Labor Day, release only the amount of water necessary to:                             <ul style="list-style-type: none"> <li>▶ Meet Base Case minimum flow commitment for each reservoir; and,</li> <li>▶ Supply 10 percent of the water needed to meet system minimum flow commitments at Chickamauga, Pickwick, and Kentucky and to prevent additional thermal power plant derates.</li> </ul> </li> </ul> <p><b>Operation 2</b></p> <ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1.</li> <li>• Between June 1 and Labor Day, release only the amount of water necessary to:                             <ul style="list-style-type: none"> <li>▶ Meet Base Case minimum flow commitment for each reservoir;</li> <li>▶ Meet tailwater recreation flows; and,</li> <li>▶ Supply 30 percent of the water needed to meet system minimum flow commitments at Chickamauga, Pickwick, and Kentucky and to prevent additional thermal power plant derates.</li> </ul> </li> </ul> <p><b>Operation 3</b></p> <ul style="list-style-type: none"> <li>• Fill reservoirs to full summer pool levels by June 1.</li> <li>• Between June 1 and Labor Day, release only the amount of water necessary to:                             <ul style="list-style-type: none"> <li>▶ Meet Base Case minimum flow commitment for each reservoir; and,</li> <li>▶ Supply 60 percent of the water needed to meet system minimum flow commitments at Chickamauga, Pickwick, and Kentucky and to prevent additional thermal power plant derates.</li> </ul> </li> </ul>

## Preliminary Alternative 10A (continued)

Alternative Characteristics	Tributary Reservoirs		
	Notes: <ul style="list-style-type: none"> <li>Remove Boone Reservoir from the cyclic operation due to substantial impacts on reservoir levels.</li> <li>Increase weekly release from Chickamauga to 25,000 cfs between August 1 and Labor Day.</li> <li>Operate mainstem reservoirs the same as described for Alternative 2A.</li> <li>Provide tailwater recreation flows as described for Alternative 7.</li> <li>For mainstem reservoirs, summer guide curves would be the same as described for Alternative 2A.</li> </ul>		
Alternative Characteristics	Tributary Reservoirs		Mainstem Reservoirs
Reservoir groups	<u>Group A</u> Norris South Holston Nottely Tims Ford	<u>Group B</u> Douglas Watauga Chatuge Fontana	Not applicable
Modify winter reservoir elevations and/or fill dates	<ul style="list-style-type: none"> <li>Raise the winter flood guides equal to the current March 15 flood guide elevations for South Holston, Watauga, Cherokee (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Douglas, Chatuge, Nottely (this would be equivalent to the new flood guide elevations established in Preliminary Alternative 1), Hiwassee, Blue Ridge, Norris, and Tims Ford.</li> <li>No change to spring fill dates.</li> </ul>		<ul style="list-style-type: none"> <li>Raise the minimum winter elevation to permit a 13-foot navigation channel (11 feet with 2 feet overdraft) on Fort Loudoun, Watts Bar, Chickamauga, Wheeler, and Pickwick.</li> <li>Modify the winter operating range of these reservoirs to allow only 1 foot of fluctuation versus the current 2 feet of fluctuation allowed.</li> <li>No change to spring fill dates.</li> </ul>

**Preliminary Alternative 10A (continued)**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify drawdown restrictions	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify rate of flood storage recovery	<ul style="list-style-type: none"> <li>Slower flood recovery; extend the current 7- to 10-day flood recovery policy to 14 to 20 days when warranted (except for Hiwassee).</li> <li>Raise Cherokee and Nottely minimum operating guide based on revised observed inflows.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
Modify water releases	<ul style="list-style-type: none"> <li>Provide tailwater recreation flows as described for Alternative 7C.</li> <li>Release only Base Case minimum flows and tailwater recreation flows between June 1 and Labor Day.</li> </ul>	<ul style="list-style-type: none"> <li>Release only Base Case minimum flows during June and July, unless additional releases are necessary to manage reservoir levels that have exceeded flood guides or to support special operations during a power system alert.</li> <li>Same as Base Case minimum flow commitments except for increasing weekly release from Chickamauga to 25,000 cfs between August 1 and Labor Day.</li> </ul>

cfs = Cubic feet per second.

## Preferred Alternative

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify summer reservoir elevations and/or drawdown dates	<ul style="list-style-type: none"> <li>• Subject to each project meeting its minimum flow requirements and a proportionate share of the system minimum flow requirements, maintain elevations as close as possible to the flood guides during summer (June 1 through Labor Day) for Blue Ridge, Chatuge, Cherokee, Douglas, Fontana, Nottely, Hiwassee, Norris, South Holston, and Watauga.</li> <li>• No changes to the following reservoirs for the reasons described: <ul style="list-style-type: none"> <li>▶ Apalachia—run-of-river project.</li> <li>▶ Bear Creek—maintains summer elevations to mid-November.</li> <li>▶ Boone—maintains summer elevations through Labor Day.</li> <li>▶ Cedar Creek—maintains summer elevations through October 31.</li> <li>▶ Fort Patrick Henry—run-of-river project.</li> <li>▶ Great Falls—maintains summer elevations through September 30.</li> <li>▶ Little Bear Creek—maintains summer elevations through October 31.</li> <li>▶ Melton Hill—run-of-river project.</li> <li>▶ Normandy—subject to meeting downstream minimum flows summer elevations are maintained through mid-October.</li> <li>▶ Ocoee #1—maintains summer elevations through October 31.</li> <li>▶ Tims Ford—maintains summer elevations through mid-October.</li> <li>▶ Upper Bear Creek—maintains the same fluctuation range year round.</li> <li>▶ Wilbur—run-of-river project.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Maintain Base Case summer operating zone through Labor Day for Chickamauga, Guntersville, Pickwick, and Wheeler.</li> <li>• Eliminate 1-foot drawdown from August 1 to November 1 for Watts Bar.</li> <li>• No changes to the following reservoirs for the reasons described: <ul style="list-style-type: none"> <li>▶ Fort Loudoun—maintains summer operating zone through October 31.</li> <li>▶ Nickajack—run-of-river project.</li> <li>▶ Wilson—maintains summer operating zone through November 30.</li> <li>▶ Kentucky—potential resource and flood risk impacts.</li> </ul> </li> </ul>



**Preferred Alternative (continued)**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify winter reservoir elevations and/or fill dates</p> <p>Modify drawdown restrictions</p> <p>Modify water releases</p>	<ul style="list-style-type: none"> <li>• Raise winter flood guide to elevations based on flood risk analysis for Boone, Chatuge, Cherokee, Douglas, Fontana, Hiwassee, Norris, Nottely, South Holston, and Watauga.</li> <li>• Great Falls—Fill reservoir to summer pool by Memorial Day.</li> <li>• Restrict drawdown June 1 through Labor Day, and proportion withdrawals to meet system minimum flows to keep tributary reservoir pool elevations as close as possible to the flood guides.</li> <li>• Same as Base Case minimum flow commitments except for additional scheduled tailwater recreation releases as shown below.</li> <li>• Apalachia—provide 25 cfs continuous minimum flow in bypass reach from June 1 through November 30.</li> </ul>	<ul style="list-style-type: none"> <li>• Raise minimum winter pool elevation by 0.5 foot at Wheeler.</li> <li>• Follow the Base Case fill schedule during the first week in April for Fort Loudoun, Watts Bar, and Chickamauga. Then delay the fill to reach summer operating zone by mid-May.</li> <li>• Maintain Base Case summer operating zone at Chickamauga, Gunterville, Wheeler, and Pickwick through Labor Day.</li> <li>• Establish weekly average Chickamauga Reservoir releases from the first week in June through Labor Day as described below. <ul style="list-style-type: none"> <li>▶ If above system minimum operations guide curve, increase weekly average minimum flow from Chickamauga each week during June and July (beginning with 14,000 cfs the first week in June, increasing 1,000 cfs each week for the next 3 weeks, then increasing 2,000 cfs each week for the next 4 weeks, and ending with 25,000 cfs the last week in July).</li> <li>▶ If below system minimum operations guide curve, release 13,000 cfs weekly average minimum flow from Chickamauga during June and July.</li> </ul> </li> <li>• Release 29,000 cfs weekly average minimum flow from Chickamauga from August 1 through Labor Day if above system minimum operations guide curve or 25,000 cfs if below system minimum operations guide curve.</li> <li>• Provide continuous minimum flows up to 25,000 cfs at Kentucky, as needed, to maintain minimum tailwater elevation of 301 feet.</li> </ul>

## Preferred Alternative (continued)

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
Modify tailwater recreation releases	<ul style="list-style-type: none"> <li>• No change in tailwater recreation releases below Great Falls, Ocoee #2, Ocoee #3, Tims Ford, and Upper Bear Creek Reservoirs.</li> <li>• Provide tailwater recreation flows for the projects as described below: <ul style="list-style-type: none"> <li>▶ Apalachia <ul style="list-style-type: none"> <li>May 1 through October 31 (Saturdays and Sundays only)</li> <li>Minimum flow only prior to 10 a.m.</li> <li>Memorial Day through Labor Day (7 days per week)</li> <li>One-unit use from 10 a.m. to 11 a.m.</li> <li>Two-unit use from 11 a.m. to 7 p.m. (8 hours)</li> <li>Labor Day through October 31 (Saturdays only)</li> <li>One-unit use from 10 a.m. to 11 a.m.</li> <li>Two-unit use from 11 a.m. to 3 p.m. (4 hours)</li> </ul> </li> <li>▶ Norris <ul style="list-style-type: none"> <li>May 1 through October 31 (Saturdays and Sundays only)</li> <li>Minimum flow only prior to 10 a.m.</li> <li>Memorial Day through Labor Day (Saturdays and Sundays only)</li> <li>One-unit use from 10 a.m. to 2 p.m. (4 hours)</li> <li>Two-unit use from 2 p.m. to 6 p.m. (4 hours)</li> <li>Labor Day through October 31 (Saturday only)</li> <li>One-unit use from 10 a.m. to 1 p.m. (3 hours)</li> <li>Two-unit use from 1 p.m. to 4 p.m. (3 hours)</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>

**Preferred Alternative (continued)**

Alternative Characteristics	Tributary Reservoirs	Mainstem Reservoirs
<p>Modify tailwater recreation releases (continued)</p>	<ul style="list-style-type: none"> <li>▶ Ocoee #1 June 1 through August 31 (Tuesdays and Wednesdays only) Minimum flow only until 11 a.m. Minimum two-unit use from 11 a.m. to 5 p.m. (6 hours)</li> <li>▶ South Holston April 1 through October 31 Increase minimum flow below the weir to 150 cfs</li> <li>▶ Watauga operation for recreation flows below Wilbur Memorial Day through Labor Day Mondays – Fridays—one-unit use from 1 p.m. to 6 p.m. (5 hours) Saturdays—one-unit use from 12 p.m. to 1 p.m. Two-unit use from 1 p.m. to 5 p.m. (4 hours) One-unit use from 5 p.m. to 6 p.m.</li> <li>Labor Day through October 31 Saturdays only—one-unit use from 1 p.m. to 6 p.m. (5 hours)</li> </ul>	

cfs = Cubic feet per second.

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