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D4b.1 Introduction

For purposes of impact assessment, the ROS Weekly Scheduling Model (WSM) weekly guide curve model was used to compare changes in the duration of summer pool, summer pool fill dates, and maximum summer and winter pool elevations for system reservoirs under all nine alternatives. This assessment evaluated changes on 22 reservoirs where proposed changes would deviate from existing operations. The median year feature of the ROS model was selected for comparative purposes.

D4b.2 Parameter Selection

Four parameters (summer pool duration, maximum summer pool elevation, summer pool fill dates, and maximum extended winter pool elevation) were selected for analysis with the WSM weekly guide curve model to provide these data for each reservoir. These four parameters were selected because they have profound influences on wetland ecology and hydrology. The three summer pool parameters control the availability of water to wetlands during the growing season or the time of year that plants are actively growing. Water is a key element in wetlands; the amount of water in a wetland controls how large the wetland is, the type of wetland it is, and the kinds of plants and animals that live there. Winter pool conditions affect the exposure and development of flats.

Duration of summer pool was selected because the length of time that summer pool conditions are maintained controls the length of time that water is available in reservoir-influenced wetlands during the growing season. Maximum summer pool elevation was selected because the summer pool elevation controls the area that water can reach in reservoir-influenced wetlands. Summer fill date was selected because it influences when water is available in reservoir-influenced wetlands. Winter pool elevation was selected because it influences the extent to which flats are exposed for seed germination (seeds of most wetland and lacustrine plants cannot germinate under water), and it controls the exposure of flats for shorebird foraging habitat.

Changes in summer pool (duration and elevation) and winter pool (maximum elevation) conditions for all policy alternatives were compared with the Base Case to determine the effect (positive or negative) of each alternative on wetland habitats, wetland water regimes, and wetland functions and to determine an approximate magnitude of those effects. For the purpose of comparison, changes in wetlands on mainstem reservoirs, tributary reservoirs, and tailwaters were compared separately. Since the ROS model does not deal directly with tailwaters, evaluation of tailwater wetlands used data generated by water quality modeling conducted for the threatened and endangered species environmental impact analysis. Relevant data from this analysis included minimum surface water elevations that are expected to occur during 90 percent of the year in tailwaters below dams. Mainstem and tributary tailwaters were evaluated separately because this modeling indicated that proposed changes in tailwaters would vary considerably between the two groups.

D4b.3 Summer Pool Duration

Changes in summer pool duration are summarized in Tables D4b-01 through D4b-03. Table D4b-01 shows duration of summer pool measured in weeks for the Base Case and the policy alternatives. Table D4b-02 shows the change in duration of summer pool measured in weeks for the policy alternatives compared to the Base Case. Table D4b-03 shows the ratio of change in duration of summer pool measured for the policy alternatives compared to the Base Case. The ratios in Table D4b-03 were used to derive the coefficients that were used to describe the direction (positive or negative) and magnitude of effect for each reservoir under each alternative.

D4b.4 Summer Pool Elevation

Changes in summer pool elevation are summarized in Tables D4b-04 through D4b-06. Table D4b-04 shows elevation of summer pool measured in feet for the Base Case and the policy alternatives. Table D4b-05 shows the change in elevation of summer pool measured in feet for the policy alternatives compared to the Base Case. Table D4b-06 shows the ratio of change in elevation of summer pool measured for the policy alternatives compared to the Base Case. The ratios in Table D4b-06 were used to derive the coefficients that were used to describe the direction (positive or negative) and magnitude of effect for each reservoir under each alternative.

D4b.5 Summer Fill Dates

Under the Equalized Summer/Winter Flood Risk Alternative, the date that affected mainstem reservoirs would reach summer pool would be delayed several weeks when compared to existing operations. Table D4b-07 shows the change in summer fill date in weeks for the policy alternatives relative to the Base Case. Most of the mainstem reservoirs would be affected by this delay. Summer pool fill dates would not be delayed on tributary reservoirs.

D4b.6 Winter Pool Elevation

Maximum extended winter pool elevations would vary from reservoir to reservoir under the various alternatives. Winter pool elevations affect the exposure of flats in reservoirs. Exposed flats provide a mineral soil bed needed by seeds of various wetland and lacustrine plants for germination. Exposed flats also provide foraging habitat needed by many shorebirds for winter habitat or during spring and fall migrations. Table D4b-08 shows maximum extended winter pool elevations, and Table D4b-09 shows relative change in winter pool elevation relative to the Base Case.

Table D4b-01 Duration of Summer Pool (weeks)

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	10	13	18	5	13	10	18	13	10
Kentucky	10	13	18	5	13	10	18	13	10
Pickwick	12	16	21	8	18	12	21	16	20
Wilson	32	32	32	7	32	32	32	32	32
Wheeler	15	15	20	7	18	15	20	15	20
Guntersville	11	15	20	7	18	11	20	15	20
Chickamauga	10	14	19	6	18	10	19	14	16
Watts Bar	23	23	27	6	18	24	27	23	23
Fort Loudoun	27	27	27	6	17	27	27	27	23
Tributary Reservoirs									
Great Falls	9	16	16	3	3	9	13	13	18
Tims Ford	7	7	13	2	4	6	13	6	7
Blue Ridge	4	10	15	2	6	4	14	28	9
Hiwassee	3	8	14	2	11	7	7	18	8
Chatuge	2	9	14	1	4	2	7	21	1
Nottely	2	8	14	1	2	4	6	20	2
Norris	4	8	12	2	8	4	13	13	8
Fontana	2	8	13	1	4	3	14	18	10
Douglas	2	8	13	1	2	5	13	21	2
Boone	13	13	15	1	2	13	15	13	15
South Holston	3	9	8	1	3	3	9	6	6
Cherokee	2	8	13	1	3	2	13	15	6
Watauga	2	7	8	1	7	6	3	10	4

Table D4b-02 Changes in Summer Pool Duration (weeks) Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	3	8	-5	3	0	8	3	0
Kentucky	0	3	8	-5	3	0	8	3	0
Pickwick	0	4	9	-4	6	0	9	4	8
Wilson	0	0	0	-25	0	0	0	0	0
Wheeler	0	0	5	-8	3	0	5	0	5
Guntersville	0	4	9	-4	7	0	9	4	9
Chickamauga	0	4	9	-4	8	0	9	4	6
Watts Bar	0	0	4	-17	-5	1	4	0	-4
Fort Loudoun	0	0	0	-21	-10	0	0	0	-4
Tributary Reservoirs									
Great Falls	0	7	7	-6	-6	0	4	4	9
Tims Ford	0	0	6	-5	-3	-1	6	-1	0
Blue Ridge	0	6	11	-2	2	0	10	24	5
Hiwassee	0	5	11	-1	8	4	4	15	5
Chatuge	0	7	12	-1	2	0	5	19	-1
Nottely	0	6	12	-1	0	2	4	18	0
Norris	0	4	8	-2	4	0	9	9	4
Fontana	0	6	11	-1	2	1	12	16	8
Douglas	0	6	11	-1	0	3	11	19	0
Boone	0	0	2	-12	-11	0	2	0	2
South Holston	0	6	5	-2	0	0	6	3	3
Cherokee	0	6	11	-1	1	0	11	13	4
Watauga	0	5	6	-1	5	4	1	8	2

Table D4b-03 Ratio of Changes in Duration of Summer Pool Compared to the Base Case

Reservoirs	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	10	0.30	0.80	-0.50	0.30	0.00	0.80	0.30	0.00
Kentucky	10	0.30	0.80	-0.50	0.30	0.00	0.80	0.30	0.00
Pickwick	12	0.33	0.75	-0.33	0.50	0.00	0.75	0.33	0.67
Wilson	32	0.00	0.00	-0.78	0.00	0.00	0.00	0.00	0.00
Wheeler	15	0.00	0.33	-0.53	0.20	0.00	0.33	0.00	0.33
Guntersville	11	0.36	0.82	-0.36	0.64	0.00	0.82	0.36	0.82
Chickamauga	10	0.40	0.90	-0.40	0.80	0.00	0.90	0.40	0.60
Watts Bar	23	0.00	0.17	-0.74	-0.22	0.04	0.17	0.00	-0.15
Fort Loudoun	27	0.00	0.00	-0.78	-0.37	0.00	0.00	0.00	-0.15
Tributary Reservoirs									
Great Falls	9	0.78	0.78	-0.67	-0.67	0.00	0.44	0.44	1.00
Tims Ford	7	0.00	0.86	-0.71	-0.43	-0.14	0.86	-0.14	0.00
Blue Ridge	4	1.50	2.75	-0.50	0.50	0.00	2.50	6.00	1.25
Hiwassee	3	1.67	3.67	-0.33	2.67	1.33	1.33	5.00	1.67
Chatuge	2	3.50	6.00	-0.50	1.00	0.00	2.50	9.50	-0.50
Nottely	2	3.00	6.00	-0.50	0.00	1.00	2.00	9.00	0.00
Norris	4	1.00	2.00	-0.50	1.00	0.00	2.25	2.25	1.00
Fontana	2	3.00	5.50	-0.50	1.00	0.50	6.00	8.00	4.00
Douglas	2	3.00	5.50	-0.50	0.00	1.50	5.50	9.50	0.00
Boone	13	0.00	0.15	-0.92	-0.85	0.00	0.15	0.00	0.15
South Holston	3	2.00	1.67	-0.67	0.00	0.00	2.00	1.00	1.00
Cherokee	2	3.00	5.50	-0.50	0.50	0.00	5.50	6.50	2.00
Watauga	2	2.50	3.00	-0.50	2.50	2.00	0.50	4.00	1.00

Table D4b-04 Maximum Extended Summer Pool Elevation (feet)

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	359	359	359	359	359	359	359	359	359
Kentucky	359	359	359	359	359	359	359	359	359
Pickwick	414	414	414	414	414	414	414	414	414
Wilson	507	507	507	507	507	507	507	507	507
Wheeler	556	556	556	556	556	556	556	556	556
Guntersville	595	595	595	595	595	595	595	595	595
Chickamauga	682	682	682	682	682	682	682	682	682
Watts Bar	741	741	741	741	741	741	741	741	741
Fort Loudoun	813	813	813	813	813	813	813	813	813
Tributary Reservoirs									
Great Falls	800	800	800	800	800	800	800	800	800
Tims Ford	888	888	888	888	884	888	888	888	888
Blue Ridge	1,686	1,686	1,686	1,686	1,680	1,687	1,687	1,688	1,688
Hiwassee	1,520	1,520	1,520	1,520	1,508	1,521	1,520	1,521	1,521
Chatuge	1,926	1,926	1,926	1,926	1,923	1,926	1,926	1,926	1,926
Nottely	1,777	1,777	1,777	1,777	1,774	1,777	1,777	1,777	1,777
Norris	1,018	1,019	1,019	1,018	1,012	1,018	1,018	1,020	1,019
Fontana	1,703	1,703	1,703	1,703	1,682	1,703	1,703	1,703	1,703
Douglas	994	994	994	994	986	994	994	994	994
Boone	1,382	1,382	1,382	1,382	1,382	1,382	1,382	1,382	1,382
South Holston	1,729	1,729	1,729	1,729	1,727	1,728	1,729	1,728	1,728
Cherokee	1,070	1,071	1,071	1,071	1,067	1,070	1,071	1,071	1,069
Watauga	1,959	1,959	1,959	1,959	1,962	1,958	1,957	1,958	1,958

Table D4b-05 Changes in Summer Pool Elevation (feet) Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0
Pickwick	0	0	0	0	0	0	0	0	0
Wilson	0	0	0	0	0	0	0	0	0
Wheeler	0	0	0	0	0	0	0	0	0
Guntersville	0	0	0	0	0	0	0	0	0
Chickamauga	0	0	0	0	0	0	0	0	0
Watts Bar	0	0	0	0	0	0	0	0	0
Fort Loudoun	0	0	0	0	0	0	0	0	0
Tributary Reservoirs									
Great Falls	0	0	0	0	0	0	0	0	0
Tims Ford	0	0	0	0	-4	0	0	0	0
Blue Ridge	0	0	0	0	-6	1	1	2	2
Hiwassee	0	0	0	0	-12	1	0	1	1
Chatuge	0	0	0	0	-3	0	0	0	0
Nottely	0	0	0	0	-3	0	0	0	0
Norris	0	1	1	0	-6	0	0	2	1
Fontana	0	0	0	0	-21	0	0	0	0
Douglas	0	0	0	0	-8	0	0	0	0
Boone	0	0	0	0	0	0	0	0	0
South Holston	0	0	0	0	-2	-1	0	-1	-1
Cherokee	0	1	1	1	-3	0	1	1	-1
Watauga	0	0	0	0	3	-1	-2	-1	-1

Table D4b-06 Ratio of Change in Summer Pool Elevation Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0
Pickwick	0	0	0	0	0	0	0	0	0
Wilson	0	0	0	0	0	0	0	0	0
Wheeler	0	0	0	0	0	0	0	0	0
Guntersville	0	0	0	0	0	0	0	0	0
Chickamauga	0	0	0	0	0	0	0	0	0
Watts Bar	0	0	0	0	0	0	0	0	0
Fort Loudoun	0	0	0	0	0	0	0	0	0
Tributary Reservoirs									
Great Falls	0	0	0	0	0	0	0	0	0
Tims Ford	0	0	0	0	-0.00450	0	0	0	0
Blue Ridge	0	0	0	0	-0.00356	0.00059	0.00059	0.00119	0.001186
Hiwassee	0	0	0	0	-0.00789	0.00066	0	0.00066	0.000658
Chatuge	0	0	0	0	-0.00156	0	0	0	0
Nottely	0	0	0	0	-0.00169	0	0	0	0.000563
Norris	0	0.00098	0.00098	0	-0.00589	0	0	0.00196	0.000982
Fontana	0	0	0	0	-0.01235	0	0	0	0
Douglas	0	0	0	0	-0.00805	0	0	0	0
Boone	0	0	0	0	0	0	0	0	0
South Holston	0	0	0	0	-0.00116	-0.00058	0	-0.00058	-0.00058
Cherokee	0	0.00093	0.00093	0.00093	-0.00280	0	0.00093	0.00093	-0.00093
Watauga	0	0	0	0	0.00153	-0.00051	-0.00102	-0.00051	-0.00051

Table D4b-07 Changes in Summer Filling Date (weeks) Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0	0	0	-4	0	0	0	0
Kentucky	0	0	0	0	-4	0	0	0	0
Pickwick	0	0	0	0	-7	0	0	0	-1
Wilson	0	0	0	0	0	0	0	0	0
Wheeler	0	0	0	0	-6	0	0	0	0
Guntersville	0	0	0	0	-6	0	0	0	0
Chickamauga	0	0	0	0	-5	0	0	0	-4
Watts Bar	0	0	0	0	-5	0	0	0	-4
Fort Loudoun	0	0	0	0	0	0	0	0	-4
Tributary Reservoirs									
Great Falls	0	0	0	0	0	0	0	0	-2
Tims Ford	0	0	0	0	-14	0	0	0	0
Blue Ridge	0	0	0	0	-2	0	0	0	-4
Hiwassee	0	0	0	0	2	0	0	0	0
Chatuge	0	0	0	0	4	0	0	0	-1
Nottely	0	0	0	0	-2	0	0	0	0
Norris	0	0	0	0	-11	0	0	0	0
Fontana	0	0	0	0	-2	0	0	0	1
Douglas	0	0	0	0	-2	0	0	0	0
Boone	0	0	0	0	-13	0	0	0	0
South Holston	0	0	0	0	-7	0	0	0	-4
Cherokee	0	0	0	0	-8	0	0	0	-2
Watauga	0	0	0	0	4	0	0	0	-4

Note: Negative numbers indicate a delay from normal filling dates.

Table D4b-08 Maximum Extended Winter Pool Elevation (feet msl)

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	354.3	354.3	356	354.3	354.3	356	356	354.3	354.3
Kentucky	354.3	354.3	356	354.3	354.3	356	356	354.3	354.3
Pickwick	409	410.5	410.5	409	409	410.5	410.5	410.5	409
Wilson	505.5	505.5	505.5	505.5	505.5	505.5	505.5	505.5	505.5
Wheeler	551	552.5	552.5	551	552.5	552.5	552.5	552.5	551.5
Guntersville	593.3	593.3	593.3	593.3	593.3	593.3	593.3	593.3	593.3
Chickamauga	676	677.5	677.5	676	675	677.5	677.5	677.5	676
Watts Bar	736	737.5	737.5	736	735	737.5	737.5	737.5	736
Fort Loudoun	808	809.5	809.5	808	807	809.5	809.5	809.5	808
Tributary Reservoirs									
Great Falls	785	785	785	785	785	785	785	785	785
Tims Ford	873	877	871.8	871	865	872.5	871.5	877	873
Blue Ridge	1,650	1,670	1,660	1,660	1,669	1,650	1,660	1,678	1,667
Hiwassee	1,468	1,482	1,480	1,480	1,470	1,468	1,480	1,485	1,482
Chatuge	1,913	1,916	1,918	1,916	1,916	1,913	1,918.5	1,917	1,917.5
Nottely	1,747	1,757	1,763	1,755	1,761.5	1,747	1,763	1,762	1,761
Norris	985	999	1,005	1,005	996	985	1,005	1,000	998
Fontana	1,642	1,628	1,658	1,658	1,654	1,636	1,658	1,644	1,650
Douglas	940	958	958	958	946	940	956	958	953
Boone	1,356	1,356	1,356	1,356	1,364	1,356	1,356	1,356	1,362
South Holston	1,698	1,712	1,723	1,707	1,719	1,697	1,723	1,713	1,706
Cherokee	1,030	1,045	1,052	1,050	1,050	1,030	1,053	1,046	1,044
Watauga	1,937	1,946	1,955	1,944	1,954	1,938	1,948	1,952	1,950

Table D4b-09 Change in Winter Pool Elevation (feet) Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0	1.7	0	0	1.7	1.7	0	0
Kentucky	0	0	1.7	0	0	1.7	1.7	0	0
Pickwick	0	1.5	1.5	0	0	1.5	1.5	1.5	0
Wilson	0	0	0	0	0	0	0	0	0
Wheeler	0	1.5	1.5	0	1.5	1.5	1.5	1.5	0.5
Guntersville	0	0	0	0	0	0	0	0	0
Chickamauga	0	1.5	1.5	0	-1	1.5	1.5	1.5	0
Watts Bar	0	1.5	1.5	0	-1	1.5	1.5	1.5	0
Fort Loudoun	0	1.5	1.5	0	-1	1.5	1.5	1.5	0
Tributary Reservoirs									
Great Falls	0	0	0	0	0	0	0	0	0
Tims Ford	0	4	-1.2	-2	-8	-0.5	-1.5	4	0
Blue Ridge	0	20	10	10	19	0	10	28	17
Hiwassee	0	14	12	12	2	0	12	17	14
Chatuge	0	3	5	3	3	0	5.5	4	4.5
Nottely	0	10	16	8	14.5	0	16	15	14
Norris	0	14	20	20	11	0	20	15	13
Fontana	0	-14	16	16	12	-6	16	2	8
Douglas	0	18	18	18	6	0	16	18	13
Boone	0	0	0	0	8	0	0	0	6
South Holston	0	14	25	9	21	-1	25	15	8
Cherokee	0	15	22	20	20	0	23	16	14
Watauga	0	9	18	7	17	1	11	15	13

D4b.7 Tailwaters

Each alternative would result in different effects on flow in tailwaters. Changes in flow would in turn affect the elevation of the water surface in tailwaters, and these changes would affect mainstem reservoirs differently. A summary of anticipated changes in minimum elevations on mainstem and tributary tailwaters is shown in Table D4b-10. (See detailed descriptions of changes in Appendix D6b.)

In general, water elevations on tailwaters of mainstem reservoirs would increase from 1 to 2 feet over Base Case conditions for Reservoir Recreation Alternative A, Reservoir Recreation Alternative B, the Tailwater Recreation Alternative, and the Tailwater Habitat Alternative; decrease up to 1 foot for the Equalized Summer/Winter Flood Risk Alternative minimum elevation; and increase up to 1 foot for the Commercial Navigation Alternative. On tailwater reservoirs, projected surface water elevations are expected to be essentially equal for the Base Case and Reservoir Recreation Alternative A, Reservoir Recreation Alternative A, the Equalized Summer/Winter Flood Risk Alternative, Commercial Navigation Alternative, and the Tailwater Recreation Alternative. Water levels on tributary tailwaters could increase up to 0.5 foot under the Tailwater Habitat Alternative. Because the water quality model was not able to provide any data for the Summer Hydropower Alternative, an inverse relationship was assumed between pool conditions on reservoirs and releases from dams to tailwaters. For example, as the duration of summer pool increases; the water released to tailwaters decreases.

D4b.8 Integration of Changes in Reservoir Conditions

Since summer pool conditions control wetland hydrology in reservoir and tailwater wetlands, summer pool data were used to determine the magnitude of effects for wetlands each reservoir and tailwater. Winter pool ratios were not used since they primarily affect exposure of flats during the dormant season for most plants. The ratio of changes in duration and elevation of summer pool and elevation compared to the Base Case (see Tables D4b-03 and D4b-06) were combined to create a unique set of coefficients for each reservoir. These two ratios were added for each reservoir and each alternative. Because this sum was greater than 1 (Table D4b-11), this sum was multiplied by 0.1 to produce a set of coefficients between 0 and 1 (Table D4b-12).

These coefficients were then multiplied by wetland acreages on each affected reservoir obtained from National Wetland Inventory data in order to derive a number that described the magnitude of potential impacts on each reservoir's and tailwaters' wetlands. This was done reservoir by reservoir for each wetland vegetation type, wetland water regime, and other selected wetland functional categories discussed in Section 4.8 . The derived values were summed for each reservoir affected by each alternative and sums were compared to evaluate the effect of each alternative on wetlands.

Table D4b-10 Potential Changes in Minimum Surface Water Elevations in Mainstem and Tributary Tailwaters

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem tailwaters	0	1–2 ft	1–2 ft	>2 ft	-1 ft	0–1 ft	1–2 ft	1–2 ft	1–2 ft
Tributary reservoirs	0	0	0	>2 ft	0	0	0	0–0.5 ft	0

Table D4b-11 Derivation of Reservoir-Specific Coefficients, Step 1: Sum Ratios of Changes in Summer Pool Duration and Elevation Relative to the Base Case

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0.300	0.800	-0.500	0.300	0.000	0.800	0.300	0.00000
Kentucky	0	0.300	0.800	-0.500	0.300	0.000	0.800	0.300	0.00000
Pickwick	0	0.333	0.750	-0.333	0.500	0.000	0.750	0.333	0.66667
Wilson	0	0.000	0.000	-0.781	0.000	0.000	0.000	0.000	0.00000
Wheeler	0	0.000	0.333	-0.533	0.200	0.000	0.333	0.000	0.33333
Guntersville	0	0.364	0.818	-0.364	0.636	0.000	0.818	0.364	0.81818
Chickamauga	0	0.400	0.900	-0.400	0.800	0.000	0.900	0.400	0.60000
Watts Bar	0	0.000	0.174	-0.739	-0.217	0.043	0.174	0.000	-0.14815
Fort Loudoun	0	0.000	0.000	-0.778	-0.370	0.000	0.000	0.000	-0.14815
Tributary Reservoirs									
Great Falls	0	0.778	0.778	-0.667	-0.667	0.000	0.444	0.444	1.00000
Tims Ford	0	0.000	0.857	-0.714	-0.433	-0.143	0.857	-0.143	0.00000
Blue Ridge	0	1.500	2.750	-0.500	0.496	0.001	2.501	6.001	1.25119
Hiwassee	0	1.667	3.667	-0.333	2.659	1.334	1.333	5.001	1.66732
Chatuge	0	3.500	6.000	-0.500	0.998	0.000	2.500	9.500	-0.50000
Nottely	0	3.000	6.000	-0.500	-0.002	1.000	2.000	9.000	0.00056
Norris	0	1.001	2.001	-0.500	0.994	0.000	2.250	2.252	1.00098
Fontana	0	3.000	5.500	-0.500	0.988	0.500	6.000	8.000	4.00000
Douglas	0	3.000	5.500	-0.500	-0.008	1.500	5.500	9.500	0.00000
Boone	0	0.000	0.154	-0.923	-0.846	0.000	0.154	0.000	0.15385
South Holston	0	2.000	1.667	-0.667	-0.001	-0.001	2.000	0.999	0.99942
Cherokee	0	3.001	5.501	-0.499	0.497	0.000	5.501	6.501	1.99907
Watauga	0	2.500	3.000	-0.500	2.502	1.999	0.499	3.999	0.99949

Table D4b-12 Derivation of Reservoir-Specific Coefficients, Step 2: Multiply Sum of Ratio of Changes in Summer Pool Duration and Elevation Relative to the Base Case by 0.1

Reservoir	Alternative								
	Base Case	Reservoir Recreation A	Reservoir Recreation B	Summer Hydropower	Equalized Summer/Winter Flood Risk	Commercial Navigation	Tailwater Recreation	Tailwater Habitat	Preferred
Mainstem Reservoirs									
Barkley	0	0.030	0.080	-0.050	0.030	0.000	0.080	0.030	0
Kentucky	0	0.030	0.080	-0.050	0.030	0.000	0.080	0.030	0
Pickwick	0	0.033	0.075	-0.033	0.050	0.000	0.075	0.033	0.066667
Wilson	0	0.000	0.000	-0.078	0.000	0.000	0.000	0.000	0
Wheeler	0	0.000	0.033	-0.053	0.020	0.000	0.033	0.000	0.033333
Guntersville	0	0.036	0.082	-0.036	0.064	0.000	0.082	0.036	0.081818
Chickamauga	0	0.040	0.090	-0.040	0.080	0.000	0.090	0.040	0.06
Watts Bar	0	0.000	0.017	-0.074	-0.022	0.004	0.017	0.000	-0.01481
Fort Loudoun	0	0.000	0.000	-0.078	-0.037	0.000	0.000	0.000	-0.01481
Tributary Reservoirs									
Great Falls	0	0.078	0.078	-0.067	-0.067	0.000	0.044	0.044	0.1
Tims Ford	0	0.000	0.086	-0.071	-0.043	-0.014	0.086	-0.014	0
Blue Ridge	0	0.150	0.275	-0.050	0.050	0.000	0.250	0.600	0.125119
Hiwassee	0	0.167	0.367	-0.033	0.266	0.133	0.133	0.500	0.166732
Chatuge	0	0.350	0.600	-0.050	0.100	0.000	0.250	0.950	-0.05
Nottely	0	0.300	0.600	-0.050	0.000	0.100	0.200	0.900	5.63E-05
Norris	0	0.100	0.200	-0.050	0.099	0.000	0.225	0.225	0.100098
Fontana	0	0.300	0.550	-0.050	0.099	0.050	0.600	0.800	0.4
Douglas	0	0.300	0.550	-0.050	-0.001	0.150	0.550	0.950	0
Boone	0	0.000	0.015	-0.092	-0.085	0.000	0.015	0.000	0.015385
South Holston	0	0.200	0.167	-0.067	0.000	0.000	0.200	0.100	0.099942
Cherokee	0	0.300	0.550	-0.050	0.050	0.000	0.550	0.650	0.199907
Watauga	0	0.250	0.300	-0.050	0.250	0.200	0.050	0.400	0.099949

The direction (positive or negative) of the coefficients in Tables D4b-10 and D4b-11 only mirror the direction of change in wetland conditions compared to the Base Case. The actual direction of effect depends on the relationship of the increase or decrease of hydroperiod (summer pool duration and elevation) on each parameter of interest. For example, an increase in hydroperiod might be beneficial for persistent emergent communities but the same increase may adversely affect scrub/shrub and forest wetlands by interfering with seed germination and survival. In these two situations the positive effect on hydroperiod would positively affect emergents and negatively affect woody plants.

Although the derived rating numbers were obtained by multiplying these coefficients with total NWI wetland acreage for each affected reservoir or tailwater, these numbers are not intended to predict the actual effects of each alternative in terms of wetland acres. Rather the products serve to illustrate the net direction (positive or negative) and potential net effect of each alternative on wetland functions in each reservoir or tailwater. Therefore, the ratings were ranked from 1 to 8, and the direction and rankings form the basis for the discussion in Section 4.8 (see Tables 4.8-01 through 4.8-06). These products were developed to compare the effects of the proposed alternatives in terms of their potential to enhance or diminish the functioning of affected wetlands.