7. Sensitivity Analysis

Because of the qualitative nature of this study and the subjectivity involved in rating the issues for the various reservoir options, a sensitivity analysis was performed. This analyzed the changes that would occur if the weightings of the four major issues (construction magnitude, water storage, recreation, and the environment) were individually increased or decreased. These four issues account for 64 percent of the total weighting of issues. The weighting of each of the major issues was first increased, then decreased by 33 percent. The increase or decrease for each of those issues was distributed over the remaining issues as a decrease or increase so that the total of the weights continued to total to 100 percent. The 33 percent represents a possible change in cost, value, or relative importance of the issue receiving that change. The analysis was extended to include 50 percent and 100 percent increases and decreases in order to evaluate changes that occur with more extreme variations in the ratings of the issues. The adjusted weights for all cases considered are shown in Table 7.1.

The results of this analysis can be seen in Tables 7.2 through 7.5. The resulting rankings of the options are shown in Table 7.6. This shows that the two most highly ranked reservoir options remain the same as in the base case for most cases when sensitivity to weighting is considered. These are, in order of rank, the Elev. 1588 ft, 127,000 AF and Elev. 1640 ft., 257,000 AF reservoir options. The larger reservoir options rise in the ranking if the value of water storage is increased or the value of the environment is decreased. In nearly all cases, the 40,000 AF reservoir ranks the lowest.

Table 7.1 Sensitivity Analysis Weighting Adjustments

ISSUE INCR.OR DECR.	REC.	ENVIRO.	PROP.	OPER'T'N	SOC-ECN	W.QUAL.	SEEP.	RISK	PERMIT.	LEGAL	CONSTR.	SCHED.	W.SUP'LY	TOTAL
	33 percent increase													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	15.96	11.46	4.78	4.78	3.82	4.78	3.82	4.78	1.91	1.91	19.10	3.82	19.10	100
ENVIRONMENTAL	11.46	15.96	4.78	4.78	3.82	4.78	3.82	4.78	1.91	1.91	19.10	3.82	19.10	100
CONSTR. MAGNITUDE	11.01	11.01	4.59	4.59	3.67	4.59	3.67	4.59	1.84	1.84	26.60	3.67	18.35	100
WATER STORAGE	11.01	11.01	4.59	4.59	3.67	4.59	3.67	4.59	1.84	1.84	18.35	3.67	26.60	100
	33 percent decrease													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	8.04	12.54	5.23	5.23	4.18	5.23	4.18	5.23	2.09	2.09	20.90	4.18	20.90	100
ENVIRONMENTAL	12.54	8.04	5.23	5.23	4.18	5.23	4.18	5.23	2.09	2.09	20.90	4.18	20.90	100
CONSTR. MAGNITUDE	12.99	12.99	5.41	5.41	4.33	5.41	4.33	5.41	2.17	2.17	13.40	4.33	21.65	100
WATER STORAGE	12.99	12.99	5.41	5.41	4.33	5.41	4.33	5.41	2.17	2.17	21.65	4.33	13.40	100
	50 percent increase													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	18.00	11.18	4.66	4.66	3.73	4.66	3.73	4.66	1.86	1.86	18.64	3.73	18.64	100
ENVIRONMENTAL	11.18	18.00	4.66	4.66	3.73	4.66	3.73	4.66	1.86	1.86	18.64	3.73	18.64	100
CONSTR. MAGNITUDE	10.50	10.50	4.38	4.38	3.50	4.38	3.50	4.38	1.75	1.75	30.00	3.50	17.50	100
WATER STORAGE	10.50	10.50	4.38	4.38	3.50	4.38	3.50	4.38	1.75	1.75	17.50	3.50	30.00	100
	50 percent decrease													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	6.00	12.82	5.34	5.34	4.27	5.34	4.27	5.34	2.14	2.14	21.36	4.27	21.36	100
ENVIRONMENTAL	12.82	6.00	5.34	5.34	4.27	5.34	4.27	5.34	2.14	2.14	21.36	4.27	21.36	100
CONSTR. MAGNITUDE	13.50	13.50	5.63	5.63	4.50	5.63	4.50	5.63	2.25	2.25	10.00	4.50	22.50	100
WATER STORAGE	13.50	13.50	5.63	5.63	4.50	5.63	4.50	5.63	2.25	2.25	22.50	4.50	10.00	100
	100 percent increase													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	24.00	10.36	4.32	4.32	3.45	4.32	3.45	4.32	1.73	1.73	17.27	3.45	17.27	100
ENVIRONMENTAL	10.36	24.00	4.32	4.32	3.45	4.32	3.45	4.32	1.73	1.73	17.27	3.45	17.27	100
CONSTR. MAGNITUDE	9.00	9.00	3.75	3.75	3.00	3.75	3.00	3.75	1.50	1.50	40.00	3.00	15.00	100
WATER STORAGE	9.00	9.00	3.75	3.75	3.00	3.75	3.00	3.75	1.50	1.50	15.00	3.00	40.00	100
	100 percent decrease													
ORIGINAL	12	12	5	5	4	5	4	5	2	2	20	4	20	100
RECREATION	0.00	13.64	5.68	5.68	4.55	5.68	4.55	5.68	2.27	2.27	22.73	4.55	22.73	100
ENVIRONMENTAL	13.64	0.00	5.68	5.68	4.55	5.68	4.55	5.68	2.27	2.27	22.73	4.55	22.73	100
CONSTR. MAGNITUDE	15.00	15.00	6.25	6.25	5.00	6.25	5.00	6.25	2.50	2.50	0.00	5.00	25.00	100
WATER STORAGE	15.00	15.00	6.25	6.25	5.00	6.25	5.00	6.25	2.50	2.50	25.00	5.00	0.00	100

Table 7.2 Recreation Issues Sensitivity

Options	Nominal Capacity (acre-feet)	Weighted Valuations with Various Percentage of Weighting Adjustment on Recreation Issue						
		-100%	-50%	-33%	0%	33%	50%	100%
Empty Reservoir	0	-1.01	-1.20	-1.27	-1.40	-1.52	-1.59	-1.79
Lower Reservoir	40,000	-1.36	-1.49	-1.53	-1.62	-1.71	-1.75	-1.88
Reservoir Elev. 1563 ft	72,000	-0.93	-0.99	-1.01	-1.04	-1.08	-1.10	-1.15
Reservoir Elev. 1588 ft	126,841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Elev. 1640 ft	257,000	-0.35	-0.26	-0.23	-0.17	-0.11	-0.08	0.01
Reservoir Elev. 1706 ft	500,000	-0.39	-0.40	-0.41	-0.42	-0.43	-0.43	-0.45
Reservoir Elev. 1752 ft	700,000	-0.56	-0.70	-0.75	-0.84	-0.94	-0.99	-1.13
Reservoir Elev. 1814 ft	1,000,000	-0.95	-1.12	-1.18	-1.30	-1.42	-1.48	-1.65

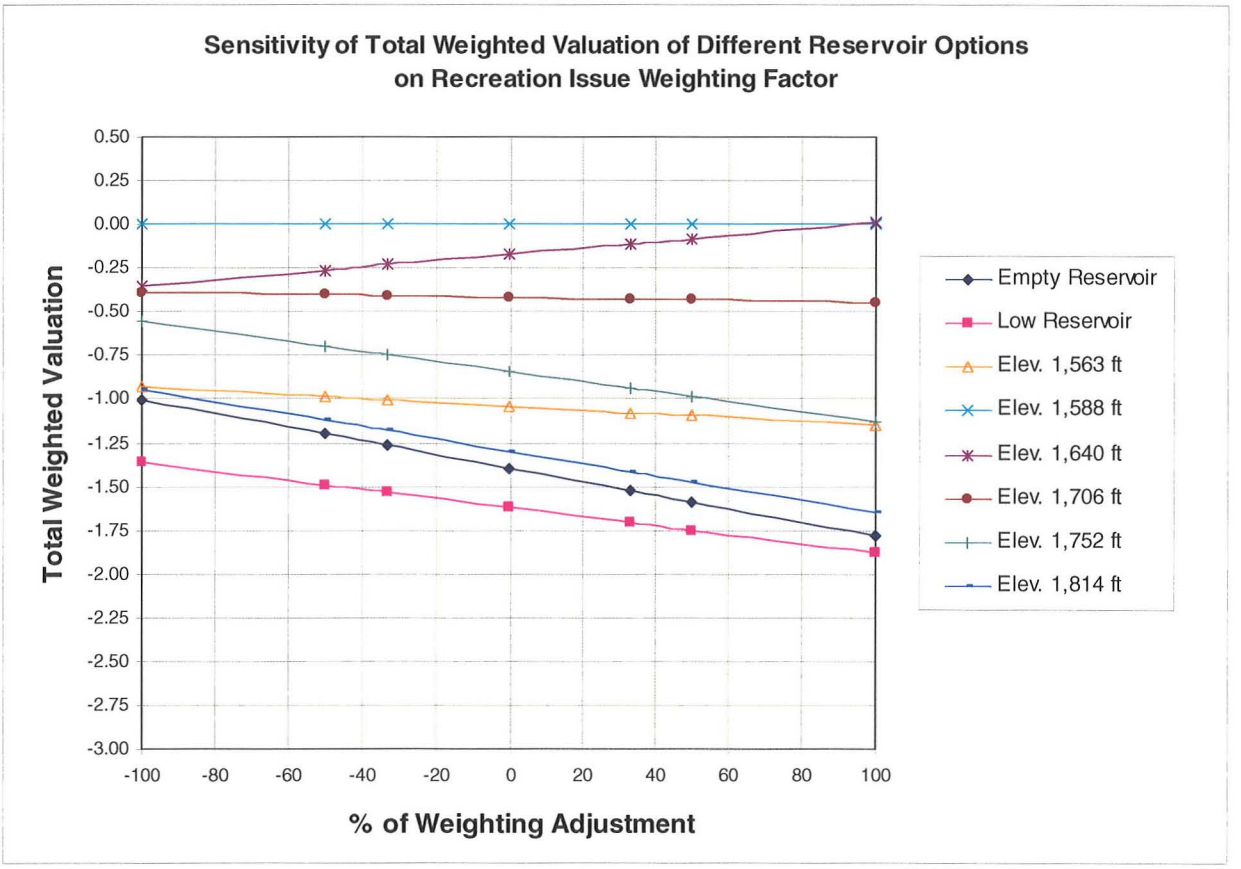

Table 7.3 Environmental Issues Sensitivity

Options	Nominal Capacity (acre-feet)	Weighted Valuations with Various Percentage of Weighting Adjustment on Environmental Issue						
		-100%	-50%	-33%	0%	33%	50%	100%
Empty Reservoir	0	-1.26	-1.33	-1.35	-1.40	-1.44	-1.47	-1.54
Lower Reservoir	40,000	-1.50	-1.56	-1.58	-1.62	-1.66	-1.68	-1.74
Reservoir Elev. 1563 ft	72,000	-0.84	-0.94	-0.98	-1.04	-1.11	-1.14	-1.24
Reservoir Elev. 1588 ft	126,841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Elev. 1640 ft	257,000	0.32	0.08	-0.01	-0.17	-0.34	-0.42	-0.67
Reservoir Elev. 1706 ft	500,000	0.13	-0.15	-0.24	-0.42	-0.60	-0.69	-0.96
Reservoir Elev. 1752 ft	700,000	-0.35	-0.60	-0.68	-0.84	-1.01	-1.09	-1.34
Reservoir Elev. 1814 ft	1,000,000	-0.87	-1.09	-1.16	-1.30	-1.44	-1.51	-1.72

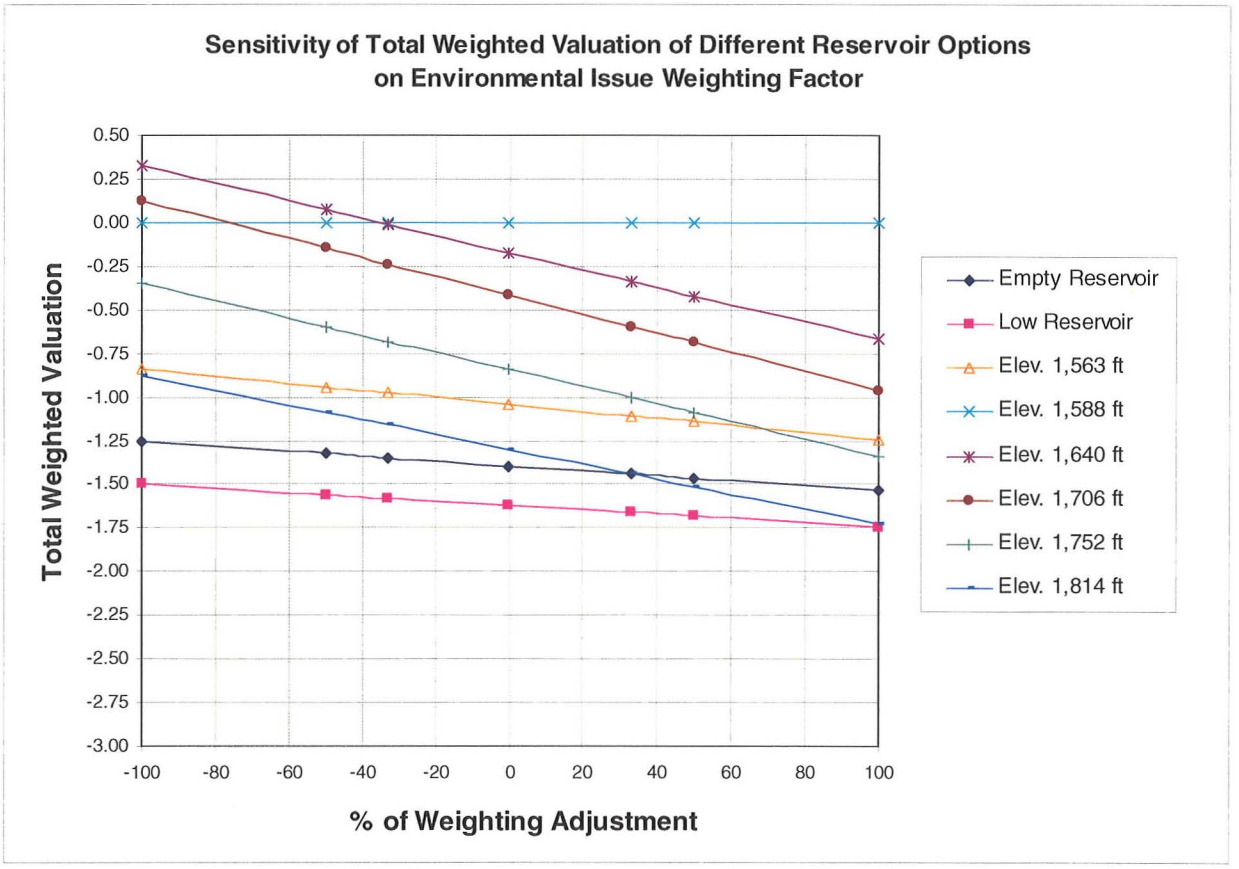

Table 7.4 Construction Magnitude Issues Sensitivity

Options	Nominal Capacity (acre-feet)	Weighted Valuations with Various Percentage of Weighting Adjustment on Construction Magnitude Issue						
		-100%	-50%	-33%	0%	33%	50%	100%
Empty Reservoir	0	-1.87	-1.63	-1.55	-1.40	-1.24	-1.16	-0.92
Lower Reservoir	40,000	-2.15	-1.89	-1.80	-1.62	-1.45	-1.36	-1.09
Reservoir Elev. 1563 ft	72,000	-1.30	-1.17	-1.13	-1.04	-0.96	-0.91	-0.78
Reservoir Elev. 1588 ft	126,841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Elev. 1640 ft	257,000	-0.09	-0.13	-0.15	-0.17	-0.20	-0.21	-0.25
Reservoir Elev. 1706 ft	500,000	-0.15	-0.28	-0.33	-0.42	-0.51	-0.55	-0.69
Reservoir Elev. 1752 ft	700,000	-0.31	-0.58	-0.67	-0.84	-1.02	-1.11	-1.38
Reservoir Elev. 1814 ft	1,000,000	-0.37	-0.84	-0.99	-1.30	-1.60	-1.76	-2.22

Table 7.5 Water Storage Issues Sensitivity

Options	Nominal Capacity (acre-feet)	Weighted Valuations with Various Percentage of Weighting Adjustment on Water Storage Issue						
		-100%	-50%	-33%	0%	33%	50%	100%
Empty Reservoir	0	-1.25	-1.32	-1.35	-1.40	-1.45	-1.47	-1.55
Lower Reservoir	40,000	-1.53	-1.57	-1.59	-1.62	-1.65	-1.67	-1.72
Reservoir Elev. 1563 ft	72,000	-1.05	-1.05	-1.05	-1.04	-1.04	-1.04	-1.03
Reservoir Elev. 1588 ft	126,841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Elev. 1640 ft	257,000	-0.72	-0.44	-0.35	-0.17	0.01	0.10	0.37
Reservoir Elev. 1706 ft	500,000	-1.27	-0.85	-0.70	-0.42	-0.14	0.01	0.44
Reservoir Elev. 1752 ft	700,000	-2.06	-1.45	-1.24	-0.84	-0.44	-0.24	0.37
Reservoir Elev. 1814 ft	1,000,000	-2.87	-2.09	-1.82	-1.30	-0.78	-0.51	0.28

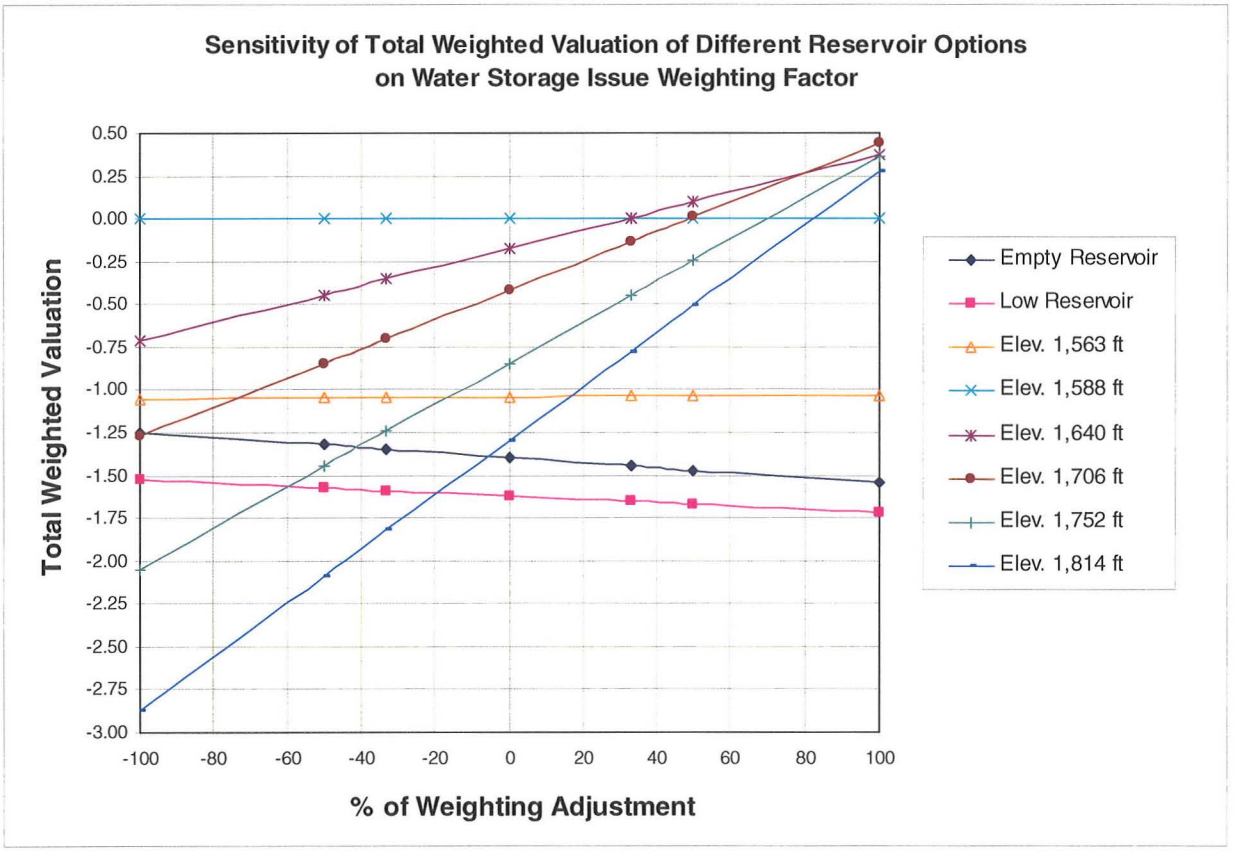

Table 7.6 Sensitivity Analysis – Rankings

Options	Nominal Capacity (acre-feet)	Sensitivity Study Variables								
		BASE CASE	Recreation	Environ-mental	Construction Magnitude	Water Storage	Recreation	Environ-mental	Construction Magnitude	Water Storage
		Percentage of Adjustment								
		0%	+33%	+33%	+33%	+33%	-33%	-33%	-33%	-33%
Empty Reservoir	0	7	7	6, 7	6	7	7	7	7	6
Lower Reservoir	40,000	8	8	8	7	8	8	8	8	7
Reservoir Elev. 1563 ft	72,000	5	5	5	4	6	5	5	6	4
Reservoir Elev. 1588 ft	126,841	1	1	1	1	2	1	1	1	1
Reservoir Elev. 1640 ft	257,000	2	2	2	2	1	2	2	2	2
Reservoir Elev. 1706 ft	500,000	3	3	3	3	3	3	3	3	3
Reservoir Elev. 1752 ft	700,000	4	4	4	5	4	4	4	4	5
Reservoir Elev. 1814 ft	1,000,000	6	6	6, 7	8	5	6	6	5	8
		0%	+50%	+50%	+50%	+50%	-50%	-50%	-50%	-50%
Empty Reservoir	0	7	7	6	6	7	7	7	7	5
Lower Reservoir	40,000	8	8	8	7	8	8	8	8	7
Reservoir Elev. 1563 ft	72,000	5	5	5	4	6	5	5	6	4
Reservoir Elev. 1588 ft	126,841	1	1	1	1	3	1	2	1	1
Reservoir Elev. 1640 ft	257,000	2	2	2	2	1	2	1	2	2
Reservoir Elev. 1706 ft	500,000	3	3	3	3	2	3	3	3	3
Reservoir Elev. 1752 ft	700,000	4	4	4	5	4	4	4	4	6
Reservoir Elev. 1814 ft	1,000,000	6	6	7	8	5	6	6	5	8
		0%	+100%	+100%	+100%	+100%	-100%	-100%	-100%	-100%
Empty Reservoir	0	7	7	6	5	7	7	7	7	4
Lower Reservoir	40,000	8	8	8	6	8	8	8	8	6
Reservoir Elev. 1563 ft	72,000	5	5	4	4	6	5	5	6	3
Reservoir Elev. 1588 ft	126,841	1	2	1	1	5	1	3	1	1
Reservoir Elev. 1640 ft	257,000	2	1	2	2	2, 3	2	1	2	2
Reservoir Elev. 1706 ft	500,000	3	3	3	3	1	3	2	3	5
Reservoir Elev. 1752 ft	700,000	4	4	5	7	2, 3	4	4	4	7
Reservoir Elev. 1814 ft	1,000,000	6	6	7	8	4	6	6	5	8