

US EPA ARCHIVE DOCUMENT

Appendix H

Projected Visibility Summaries for 20% Best and 20% Worst Days at IMPROVE Monitoring Sites

Example Calculation of the Predicted Change in Visibility on the 20% Worst Days at an IMPROVE Site

Day	1996 IMPROVE Deciviews	IMPROVE SO4 bext	IMPROVE SO4 bext	IMPROVE NO3 bext	IMPROVE OMC bext	IMPROVE EC bext	IMPROVE soil bext	IMPROVE coarse bext	2020c RRF SO4	2020c RRF NO3	2020c RRF OMC	2020c RRF EC	2020c RRF soil	2020c RRF coarse	
Day 1	21.66	87.27	46.45	14.53	9.10	3.87	0.46	2.86	1.09	1.01	0.85	0.72	0.98	1.08	
Day 2	21.50	85.83	53.58	4.50	7.79	3.92	0.65	5.38	0.94	1.04	0.95	0.76	1.02	1.10	
Day 3	23.54	105.31	67.83	11.24	8.32	4.26	0.30	3.35	0.54	0.74	0.80	0.62	1.08	1.10	
Day 4	20.11	74.72	53.60	1.93	4.84	3.04	0.13	1.18	0.57	1.70	0.70	0.50	1.06	1.08	
Day 5	21.85	88.93	51.43	7.38	10.18	1.43	0.25	8.26	0.58	1.84	0.77	0.48	1.13	1.13	
Day 6	23.83	108.41	74.33	4.42	10.62	4.13	0.28	4.63	0.58	1.14	0.83	0.52	1.13	1.11	
Day 7	24.69	118.16	80.05	5.64	12.08	7.95	0.47	1.98	0.59	0.98	0.73	0.43	1.13	1.11	
Day 8	22.34	93.35	41.44	1.65	30.37	6.73	0.28	2.88	0.74	0.70	0.91	0.81	1.07	1.11	
Day 9	22.47	94.56	59.46	4.35	12.62	3.66	0.29	4.19	0.87	0.43	0.80	0.55	1.13	1.13	
Day 10	24.11	111.40	88.74	1.26	6.50	3.49	0.02	1.39	0.61	0.42	0.78	0.45	1.14	1.12	
Day 11	32.94	269.47	235.95	1.29	15.09	6.52	0.09	0.54	0.55	0.99	0.77	0.50	1.11	1.11	
Day 12	25.23	124.60	90.91	4.25	12.87	4.67	0.33	1.58	0.70	0.38	0.88	0.62	1.12	1.13	
Day 13	30.50	211.16	179.59	3.26	11.20	5.42	0.07	1.62	0.53	1.27	0.73	0.48	1.11	1.10	
Day 14	22.30	93.00	57.95	8.26	10.37	3.50	0.28	2.65	0.60	1.28	0.76	0.44	1.11	1.11	
Day 15	24.07	111.05	77.79	3.03	13.68	3.47	0.23	2.85	0.73	1.26	0.87	0.57	1.08	1.09	
Day 16	23.37	103.49	69.05	2.34	10.74	4.87	0.33	6.15	0.82	0.88	0.89	0.77	1.08	1.10	
Day 17	20.27	75.91	54.19	1.77	4.66	2.45	0.16	2.69	1.00	0.94	0.94	0.97	1.00	1.06	
Day 18	19.98	73.76	46.74	2.46	6.05	5.49	0.15	2.85	0.74	0.66	0.80	0.68	0.96	1.07	
Day 19	22.15	91.58	65.68	2.83	6.14	4.43	0.11	2.38	0.76	1.18	0.82	0.65	0.99	1.06	
Average dv	23.52	1996 Observed values at an IMPROVE site (10 Mm-1 is added to each total bext value to account for Rayleigh scattering)							Relative Reduction Factors are calculated from REMSAD for each species based on the model predicted % reduction for each day. RRFs represent the predicted reduction from the 2001 base case to the 2020 Clear Skies control case. An RRF of 0.85 indicates a 15% reduction.						

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2020c SO4 bext	2020c NO3 bext	2020c OMC bext	2020c EC bext	2020c soil bext	2020c coarse bext	2020c Total bext	2020c Deciviews
50.72	14.73	7.74	2.80	0.45	3.08	89.52	21.92
50.56	4.67	7.43	2.99	0.66	5.93	82.24	21.07
36.96	8.35	6.68	2.62	0.32	3.67	68.60	19.26
30.32	3.27	3.39	1.52	0.13	1.27	49.90	16.07
29.60	13.55	7.84	0.69	0.28	9.29	71.25	19.64
43.09	5.01	8.77	2.14	0.32	5.13	74.46	20.08
47.55	5.52	8.80	3.39	0.53	2.20	77.98	20.54
30.47	1.16	27.58	5.48	0.30	3.20	78.18	20.56
51.88	1.88	10.11	2.01	0.33	4.74	80.94	20.91
54.45	0.52	5.04	1.58	0.02	1.56	73.18	19.90
129.76	1.28	11.58	3.28	0.10	0.60	156.59	27.51
63.97	1.63	11.29	2.90	0.36	1.78	91.93	22.18
95.33	4.13	8.23	2.59	0.08	1.79	122.15	25.03
34.82	10.55	7.86	1.55	0.31	2.93	68.03	19.17
57.15	3.82	11.93	1.99	0.25	3.11	88.25	21.78
56.81	2.06	9.60	3.76	0.35	6.77	89.36	21.90
54.39	1.66	4.36	2.38	0.16	2.85	75.80	20.26
34.51	1.62	4.82	3.73	0.15	3.05	57.87	17.56
49.62	3.34	5.05	2.87	0.10	2.52	73.50	19.95
Average dv 2020c							20.80
Reduction in dv from 2001-2020 control							-2.72
The RRFs are multiplied by the base year bext values to get the 2020 control bext predictions. The daily total bext values are converted to deciviews and then the deciview values are averaged across all days. The resultant average dv value for 2020c is subtracted from the observed value to get the predicted visibility improvement on the 20% worst days (-2.72 dv).							

Projected Visibility Summaries for 20% Best Days at IMPROVE Monitoring Sites

Site	Base 2010 Improvement from 2001 (dv)	CSA Control 2010 Improvement from 2001 (dv)	2010 Improvement from Clear Skies Only (dv)	Base 2020 Improvement from 2001 (dv)	CSA Control 2020 Improvement from 2001 (dv)	2020 Improvement from Clear Skies Only (dv)
ACAD	-0.25	-0.45	-0.21	-0.33	-0.59	-0.26
BADL	-0.29	-0.41	-0.12	-0.38	-0.53	-0.14
BAND	-0.28	-0.36	-0.08	-0.38	-0.48	-0.10
BIBE	-0.35	-0.39	-0.04	-0.39	-0.44	-0.04
BLIS	-0.40	-0.42	-0.01	-0.65	-0.67	-0.02
BRCA	-0.30	-0.34	-0.05	-0.43	-0.48	-0.05
BRID	-0.19	-0.19	0.00	-0.26	-0.26	0.00
BRIG	-0.27	-0.72	-0.45	-0.21	-0.87	-0.67
CANY	-0.17	-0.21	-0.04	-0.18	-0.23	-0.05
CHAS	-0.96	-1.87	-0.91	-1.20	-2.69	-1.49
CHIR	-0.16	-0.18	-0.03	-0.17	-0.20	-0.04
CRLA	-0.30	-0.30	0.00	-0.44	-0.44	0.00
DOSO	-0.43	-1.50	-1.08	-0.71	-2.31	-1.60
GICL	-0.17	-0.21	-0.04	-0.18	-0.23	-0.05
GLAC	-0.48	-0.49	-0.01	-0.65	-0.66	-0.01
GRCA	-0.24	-0.28	-0.04	-0.25	-0.30	-0.05
GRSA	-0.29	-0.33	-0.04	-0.36	-0.40	-0.05
GRSM	-0.44	-1.17	-0.72	-0.73	-2.09	-1.37
GUMO	-0.36	-0.44	-0.09	-0.46	-0.57	-0.11
JARB	-0.18	-0.18	0.00	-0.25	-0.25	0.00
JEFF	-0.26	-1.14	-0.88	-0.55	-1.72	-1.17
LAVO	-0.32	-0.32	0.00	-0.48	-0.48	0.00
LYBR	-0.34	-0.49	-0.15	-0.44	-0.63	-0.19
MACA	-0.76	-1.47	-0.72	-1.08	-2.06	-0.98
MEVE	-0.35	-0.39	-0.04	-0.50	-0.55	-0.04
MOOS	-0.20	-0.36	-0.16	-0.17	-0.36	-0.19
MORA	-0.48	-0.50	-0.01	-0.65	-0.67	-0.02
MOZI	-0.18	-0.20	-0.02	-0.18	-0.21	-0.02
OKEF	-0.54	-1.13	-0.58	-0.74	-1.83	-1.09
PEFO	-0.27	-0.29	-0.02	-0.23	-0.26	-0.03
PINN	-0.65	-0.66	0.00	-0.94	-0.94	0.00
PORE	-0.76	-0.77	-0.01	-1.03	-1.04	-0.01
REDW	-0.22	-0.22	0.00	-0.24	-0.24	0.00
ROMA	-0.36	-0.89	-0.53	-0.39	-1.37	-0.97
SAGO	-0.36	-0.38	-0.02	-0.44	-0.46	-0.02
SEQU	-0.52	-0.52	0.00	-0.73	-0.73	0.00
SHEN	-0.23	-1.27	-1.04	-0.49	-1.83	-1.34
SHRO	-0.24	-0.70	-0.45	-0.34	-1.23	-0.89
SIPS	-0.57	-1.11	-0.54	-0.79	-1.65	-0.86
SOLA	-0.78	-0.79	-0.01	-1.29	-1.30	-0.01
THIS	-0.23	-0.23	0.00	-0.34	-0.34	0.00
TONT	-0.23	-0.28	-0.05	-0.19	-0.25	-0.05
UPBU	-0.55	-1.01	-0.46	-0.92	-1.52	-0.61
WEMI	-0.28	-0.31	-0.03	-0.35	-0.38	-0.04
YOSE	-0.45	-0.46	-0.01	-0.69	-0.70	-0.01

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ACAD	-0.97	-1.96	-0.98	-1.33	-2.72	-1.39
BADL	-0.54	-1.18	-0.63	-0.95	-1.73	-0.78
BAND	-0.56	-0.78	-0.21	-0.84	-1.13	-0.29
BIBE	-0.30	-0.37	-0.07	-0.36	-0.49	-0.13
BLIS	-1.15	-1.15	-0.01	-1.92	-1.93	-0.01
BRCA	-0.73	-0.85	-0.12	-1.00	-1.15	-0.15
BRID	-0.84	-0.90	-0.06	-1.19	-1.29	-0.10
BRIG	-0.71	-2.09	-1.38	-1.19	-3.19	-2.00
CANY	-0.57	-0.72	-0.15	-0.76	-0.93	-0.18
CHAS	-1.46	-2.96	-1.50	-1.88	-4.31	-2.44
CHIR	-0.23	-0.38	-0.15	-0.21	-0.40	-0.18
CRLA	-1.34	-1.37	-0.03	-1.92	-1.96	-0.05
DOSO	-1.36	-3.70	-2.35	-2.28	-5.32	-3.04
GICL	-0.58	-0.69	-0.11	-0.84	-0.98	-0.14
GLAC	-0.70	-0.72	-0.03	-1.01	-1.04	-0.03
GRCA	-0.59	-0.68	-0.09	-0.66	-0.79	-0.13
GRSA	-0.65	-0.83	-0.18	-0.79	-1.00	-0.21
GRSM	-1.38	-3.37	-1.99	-2.28	-5.56	-3.29
GUMO	-0.42	-0.59	-0.17	-0.54	-0.81	-0.27
JARB	-0.90	-0.91	-0.01	-1.32	-1.34	-0.02
JEFF	-1.11	-2.92	-1.81	-1.93	-4.43	-2.50
LAVO	-1.03	-1.04	-0.01	-1.46	-1.48	-0.01
LYBR	-0.70	-1.70	-1.00	-1.03	-2.39	-1.36
MACA	-1.88	-4.09	-2.21	-2.80	-6.07	-3.27
MEVE	-0.79	-1.02	-0.23	-0.94	-1.21	-0.27
MOOS	-0.77	-1.76	-0.99	-0.98	-2.37	-1.39
MORA	-1.67	-1.76	-0.08	-2.16	-2.29	-0.13
MOZI	-0.68	-0.90	-0.23	-0.79	-1.07	-0.28
OKEF	-0.99	-2.18	-1.19	-1.39	-3.53	-2.14
PEFO	-0.51	-0.64	-0.13	-0.55	-0.70	-0.16
PINN	-1.25	-1.27	-0.02	-1.88	-1.91	-0.03
PORE	-1.43	-1.50	-0.07	-2.14	-2.22	-0.08
REDW	-1.66	-1.72	-0.06	-2.13	-2.20	-0.06
ROMA	-0.51	-1.61	-1.10	-0.77	-3.03	-2.26
SAGO	-2.08	-2.08	0.00	-2.74	-2.75	-0.01
SEQU	-1.63	-1.66	-0.03	-2.67	-2.71	-0.04
SHEN	-1.00	-3.24	-2.24	-1.88	-4.88	-3.01
SHRO	-1.67	-3.52	-1.85	-2.51	-5.62	-3.11
SIPS	-1.28	-3.11	-1.83	-2.22	-5.30	-3.08
SOLA	-1.39	-1.41	-0.02	-2.38	-2.40	-0.03
THIS	-1.52	-1.56	-0.04	-2.19	-2.24	-0.05
TONT	-0.68	-0.75	-0.07	-0.84	-0.94	-0.10
UPBU	-0.57	-2.43	-1.86	-1.30	-4.03	-2.73
WEMI	-0.72	-0.94	-0.22	-0.94	-1.21	-0.27
YOSE	-1.32	-1.33	-0.01	-2.21	-2.22	-0.01