

**Table 1: Locations of 71 IMPROVE sites and associated meteorological sites from RAWs, ISH, CASTNET, AZDEQ and NPS networks. Sites with statistically significant (at a  $p$ -level < 0.15) are shaded**

Site Name	State	Site ID	Lat.	Lon.	Elev.	Meteorological site <sup>a</sup>	Network <sup>b</sup>	Lat.	Lon.	Elev.	Dist. (in km)	Elev. Diff. (in m)
Agua Tibia	CA	AGTI	33.464	116.971	507	Oak Grove	RAWS	33.393	116.795	839	18	332
Badlands Nat. Park	SD	BADL	43.744	101.941	736	24024-726516	ISH	44.050	101.600	673	43	-63
Bandelier Nat. Monument	NM	BAND	35.780	106.266	1987	Tower	RAWS	35.833	106.333	1981	8	-6
Big Bend Nat. Park	TX	BIBE	29.303	103.178	1075	Big Bend NP	CASTNET	29.302	103.177	1052	0	-23
Bliss State Park (TRPA)	CA	BLIS	38.976	120.102	2116	93230-725847	ISH	38.900	120.000	1909	12	207
Bosque del Apache	NM	BOAP	33.870	106.852	1383	Bosque	RAWS	33.800	106.883	1372	8	-11
Brooklyn Lake	WY	BRLA	41.366	106.242	3196	Centennial	CASTNET	41.364	106.240	3178	0	18
Bryce Canyon Nat. Park	UT	BRCA	37.618	112.174	2477	23159-724756	ISH	37.700	112.150	2312	9	-164
Canyonlands Nat. Park	UT	CANY	38.459	109.821	1799	Canyonlands NP	CASTNET	38.458	109.821	1814	0	15
Chiricahua Nat.Monument	AZ	CHIR	32.009	109.389	1570	Chiricahua NM	CASTNET	32.009	109.389	1570	0	0
Columbia River Gorge	WA	CORI	45.668	121.023	201	24219-726988	ISH	45.617	121.150	73	11	-128
Craters of the Moon NM	ID	CRMO	43.461	113.555	1817	CRMO-VC	NPS	43.460	113.562	1815	0	0
Death Valley Nat. Park	CA	DEVA	36.511	116.847	125	Death Valley NM	CASTNET	36.509	116.848	125	0	0
Denali National Park	AK	DENA	63.723	148.968	658	Denali NP	CASTNET	63.726	148.963	661	0	3
Dome Lands Wilderness	CA	DOME	35.728	118.138	925	Kernville	RAWS	35.755	118.417	829	21	-68
Gila Wilderness	NM	GICL	33.220	108.235	1776	Gila Center	RAWS	33.223	108.240	1707	0	-69
Glacier Nat. Park	MT	GLAC	48.510	113.997	979	Glacier NP	CASTNET	48.510	113.996	976	0	-3
Great Basin National Park	NV	GRBA	39.005	114.216	2068	Great Basin NP	CASTNET	39.005	114.216	2060	0	-8
Great Sand Dunes Nat.Park	CO	GRSA	37.725	105.519	2504	Bighorn	RAWS	37.200	106.201	2540	83	36
Guadalupe Mountains Nat.Park	TX	GUMO	31.833	104.809	1674	23055-722620	ISH	31.833	104.817	1663	0	0
Hance Camp at Grand Canyon	AZ	GRCA	35.973	111.984	2267	Tusayan	RAWS	35.990	112.120	2041	12	-226
Hawaii Volcanoes Nat.Park	HI	HAVO	19.431	155.258	1204	Hawaii Volcanoes	CASTNET	19.420	155.240	1199	2	-5
Hillside	AZ	HILL	34.429	112.963	1510	Stanton	RAWS	34.167	112.733	1097	35	-413
Hoover Wilderness	CA	HOOV	38.089	119.176	2566	Brawley Peak	RAWS	38.261	118.880	2463	32	-103
Ike's Backbone	AZ	IKBA	34.340	111.682	1303	Ike's Backbone	AZDEQ	34.560	111.683	1280	0	0
Joshua Tree	CA	JOSH	34.069	116.389	1228	Joshua Tree NM	CASTNET	34.071	116.391	1244	0	16
Kalmiopsis Wilderness	OR	KALM	42.552	124.059	90	Agness	RAWS	42.330	124.220	46	27	-44
Lassen Volcanic Nat.Park	CA	LAVO	40.540	121.578	1755	Lassen Volcanic NP	CASTNET	40.540	121.576	1756	0	1

Lava Beds	CA	LABE	41.712	121.507	1469	Indian Well	RAWS	41.742	121.538	1454	4	-15
Lostwood Wilderness	ND	LOST	48.642	102.402	692	94011-727675	ISH	48.417	101.350	497	81	-195
Medicine Lake Wilderness	MT	MELA	48.487	104.476	605	Crosby	RAWS	48.968	104.200	650	56	45
Mesa Verde Nat. Park	CO	MEVE	37.198	108.491	2177	Mesa Verde NP	CASTNET	37.198	108.490	2165	0	-12
Monture	MT	MONT	47.122	113.154	1293	GRER	RAWS	47.183	113.447	1291	23	-2
Mount Baldy Wilderness	AZ	BALD	34.058	109.441	2513	GRER-AZDEQ	RAWS	34.070	109.433	2513	2	0
Mount Hood Wildernes	OR	MOHO	45.289	121.784	1341	Red Box	RAWS	45.280	121.921	991	10	-35
Mount Rainier Nat.Park	WA	MORA	46.758	122.123	427	Mount Rainier NP	CASTNET	46.758	122.122	421	0	-6
North Absaroka Wilderness	WY	NOAB	44.745	109.382	2480	Rattle Snake Mtn	RAWS	44.574	109.261	2568	21	88
Pasayten Wilderness	WA	PASA	48.388	119.928	1634	Washington Pass	RAWS	48.525	120.647	1720	55	86
Phoenix	AZ	PHOE	33.504	112.096	338	Phoenix	AZDEQ	33.504	112.096	33	0	0
Pinnacles Nat. Monument	CA	PINN	36.485	121.156	317	Pinnacles NM	CASTNET	36.485	121.156	335	0	18
Point Reyes Nat. Seashore	CA	PORE	38.120	122.912	85	Barnaby	RAWS	38.280	122.702	247	25	162
Puget Sound	WA	PUSO	47.570	122.312	80	24234-727935	ISH	47.533	122.300	6	4	-74
Queen Valley	AZ	QUVA	33.294	111.286	658	23104-722786	ISH	33.300	111.667	412	35	-246
Rocky Mountain Nat.Park	CO	ROMO	40.278	105.546	2755	Rocky Mtn NP	CASTNET	40.278	105.546	2804	0	49
Saguaro Nat. Park East	AZ	SAGU	32.174	110.737	933	SAGU	NPS	32.174	110.736		0	0
Saguaro Nat. Park West	AZ	SAWE	32.249	111.218	718	TUMO	AZDEQ	32.250	111.220	718	0	0
Salt Creek Wilderness	NM	SACR	33.460	104.404	1077	Eight Mile Draw	RAWS	33.651	104.322	1127	22	50
San Gabriel Wilderness	CA	SAGA	34.297	118.028	1791	93136-722890	ISH	34.233	118.067	1741	7	-50
San Gorgonio Wilderness	CA	SAGO	34.192	116.901	1705	Converse	RAWS	34.194	116.913	1712	1	7
San Pedro Parks Wilderness	NM	SAPE	36.017	106.845	2919	Quemazon Canyon	RAWS	35.926	106.384	2978	42	59
Sawtooth National Forest	ID	SAWT	44.171	114.928	1980	04112-726824	ISH	44.167	114.933	1980	0	0
Sequoia National Park	CA	SEQU	36.489	118.829	535	SEKI-AS	NPS	36.489	118.826	535	0	0
Sierra Ancha	AZ	SIAN	34.091	110.942	1595	Sierra Ancha	AZDEQ	34.150	110.930	1559	7	-36
Simeonof Wilderness	AK	SIME	55.326	160.506	57	99999-703165	ISH	55.317	160.517	7	1	-50
Snoqualamie Pass,	WA	SNPA	47.420	121.428	1160	24237-727815	ISH	47.283	121.333	1206	16	464
Spokane Res.	WA	SPOK	47.904	117.861	548	99999-727854	ISH	47.967	117.417	672	33	124
Starkey	OR	STAR	45.225	118.513	1258	J. Ridge	RAWS	45.114	118.404	1579	14	321
Sycamore Canyon	AZ	SYCA	35.141	111.969	2039	Sycamore Canyon	AZDEQ	35.130	111.970	2126	0	0
Theodore Roosevelt Nat. Park	ND	THRO	46.895	103.378	853	Theodore Roosevelt	CASTNET	46.895	103.378	850	0	-3
Three Sisters Wilderness	OR	THIS	44.291	122.043	885	Pebble	RAWS	44.233	121.983	1085	8	200
Tonto Nat.Monument	AZ	TONT	33.649	111.109	786	Roosevelt	RAWS	33.655	111.133	664	2	-122
Trapper Creek	AK	TRCR	62.315	150.316	155	26528-702510	ISH	62.317	150.100	105.2	11	-498

Trinity	CA	TRIN	40.786	122.805	1007	Lowden	RAWS	40.689	122.831	951	11	-56
UL Bend Wilderness	MT	ULBE	47.582	108.720	893	Armellscr	RAWS	47.587	108.869	867	11	-26
Weminuche Wilderness	CO	WEMI	37.659	107.800	2765	99999-724627	ISH	37.950	107.900	2769	33	-4
White Mountain Wilderness	NM	WHIT	33.470	105.523	2050	99999-722683	ISH	33.467	105.533	2076	1	26
White River Nat.Forest	CO	WHRI	39.152	106.820	3418	Taylor Park	RAWS	38.908	106.602	3256	32	-162
Wind Cave	SD	WICA	43.558	103.484	1300	Custer	RAWS	43.750	103.633	1585	24	285
Yellowstone Nat. Park 2	WY	YELL	44.565	110.400	2425	Yellowstone NP	CASTNET	44.560	110.401	2400	0	-25
Yosemite Nat. Park	CA	YOSE	37.713	119.704	1615	Yosemite NP	CASTNET	37.713	119.706	1605	0	-10
Zion Nat. Park	UT	ZION	37.459	113.224	1545	93129-724755	ISH	37.700	113.100	1702	28	158

<sup>a</sup> Meteorological site names are specific to the network. See footnote (b)

<sup>b</sup> Networks: (1) AZDEQ: operated by the Arizona Department of Environmental Quality. Site name is a four letter mnemonic; (2) CASTNET: operated by the U.S. E.P.A.. Sites are normally collocated with IMPROVE sites; (3) ISH: Integrated surface hourly data from Airports. ISH data are archived at the National Climate data center and site name corresponds to WBAN number –USAF number (4) NPS: operated by the National Park Service and normally collocated with IMPROVE sites; (5) RAWS) Remote Automated Weather Stations are operated primarily by U.S. Forest Service. Data are obtained from National Climate data center.