Appendix A: Bulk Density MANOVA Results

Bulk Density MANOVA Results for Feather Moss Fuels Stratified in 5 cm Increments

P-values of bulk densities by depth at Ft. Wainwright, AK, 1999 as determined by Tukey's honestly significant difference test for unequal sample size ($\alpha = 0.05$), Homogenous depths are indicated with bold face type.

PLOT and DEPTH	FTWW1 0 – 5 cm	FTWW1 5 – 10 cm	FTWW1 10 – 15 cm	FTWW1 15 – 20 cm	FTWW2 0 – 5 cm	FTWW2 5 – 10 cm	FTWW2 10 – 15 cm	FTWW2 15 – 20 cm	FTWW3 0 –5 cm	FTWW3 5 –10 cm	FTWW3 10 -15cm	FTWW3 15 – 20 cm
FTWW1 0 – 5cm		**0.23835**	0.00017	0.00017	**0.454874**	0.00017	0.00017	0.00017	**0.697612**	0.00017	0.00017	0.00017
FTWW1 5 – 10cm	0.023835		0.00017	0.00017	**0.954183**	0.000423	0.00017	0.00017	**0.780239**	**0.263660**	0.00017	0.00017
FTWW1 10 - 15cm	0.000017	0.00017		0.00017	0.00017	**0.317955**	0.000036	0.00017	0.00017	0.000988	0.005281	0.00017
FTWW1 15 – 20cm	0.000017	0.00017	0.00017		0.00017	0.00017	0.000032	**0.999998**	0.00017	0.00017	0.00017	**0.093582**
FTWW2 0 – 5 cm	**0.454874**	**0.954183**	0.00017	0.00017		0.00017	0.00017	0.00017	**0.99999**	0.000238	0.00017	0.00017
FTWW2 5 – 10 cm	0.000017	0.000423	**0.317955**	0.00017	0.00017		0.00017	0.00017	0.00017	**0.626230**	0.00017	0.00017

FTWW2 10 – 15 cm	0.000017	0.00017	0.000036	0.000032	0.00017	0.00017		0.000028	0.00017	0.00017	**0.984199**	0.00017
FTWW2 15 – 20 cm	0.00017	0.00017	0.00017	**0.999998**	0.00017	0.00017	0.000028		0.00017	0.00017	0.00017	**0.262398**
FTWW3 0 – 5 cm	**0.697612**	**0.780239**	0.00017	0.00017	**0.99999**	0.00017	0.00017	0.00017		0.00017	0.00017	0.00017
FTWW3 5 – 10 cm	0.00017	**0.263660**	0.000988	0.00017	0.000238	**0.626230**	0.00017	0.00017	0.00017		0.00017	0.00017
FTWW3 10 – 15 cm	0.00017	0.00017	0.005281	0.00017	0.00017	0.00017	**.984199**	0.00017	0.00017	0.00017		0.00017
FTWW3 15 – 20 cm	0.00017	0.00017	0.00017	**0.093582**	0.00017	0.00017	0.00017	**0.262398**	0.00017	0.00017	0.00017	

Bulk Density MANOVA Results for Feather Moss Fuels Stratified by Fuel Layer

P-values of bulk densities by depth at Ft. Wainwright, AK, 1999 as determined by Tukey's honestly significant difference test for unequal sample size ($\alpha = 0.05$). Homogenous depths are indicated with bold face layer.

PLOT and FUEL LAYER	FTWW1 LM	FTWW1 DM	FTWW1 UD	FTWW1 LD	FTWW2 LM	FTWW2 DM	FTWW2 UD	FTWW2 LD	FTWW3 LM	FTWW3 DM	FTWW3 UD	FTWW3 LD
FTWW1 LM		0.000017	0.000017	0.000017	**0.085399**	0.000017	0.000017	0.000017	**0.817463**	0.000017	0.000017	0.000017
FTWW1 DM	0.000017		0.000017	0.000017	0.000128	**0.806857**	0.000017	0.000017	0.000017	0.025248	0.000017	0.000017
FTWW1 UD	0.000017	0.000017		0.000017	0.000017	0.000017	0.000017	0.000017	0.000017	0.000017	**0.995548**	0.000017
FTWW1 LD	0.000017	0.000017	0.000017		0.000017	0.000017	0.000017	**0.096266**	0.000017	0.000017	0.000017	**0.191176**
FTWW2 LM	**0.85399**	0.000128	0.000017	0.000017		0.000017	0.000017	0.000017	**0.970754**	0.000017	0.000017	0.000017
FTWW2 DM	0.000017	**0.806857**	0.000017	0.000017	0.000017		0.000017	0.000017	0.000017	**0.965451**	0.000017	0.000017
FTWW2 UD	0.000017	0.000017	0.000017	0.000017	0.000017	0.000017		0.000017	0.000017	0.000017	0.000020	0.000017

FTWW2 LD	0.000017	0.000017	0.000017	**0.096266**	0.000017	0.000017	0.000017		0.000017	0.000017	0.000017	**1.00000**
FTWW3 LM	**0.817463**	0.000017	0.000017	0.000017	**0.970754**	0.000017	0.000017	0.000017		0.000017	0.000017	0.000017
FTWW3 DM	0.000017	0.025248	0.000017	0.000017	0.000017	**0.95451**	0.000017	0.000017	0.000017		0.000017	0.000017
FTWW3 UD	0.000017	0.000017	**0.995548**	0.000017	0.000017	0.000017	0.000020	0.000017	0.000017	0.000017		0.000017
FTWW3 LD	0.000017	0.000017	0.000017	**0.191176**	0.000017	0.000017	0.000017	**1.00000**	0.000017	0.000017	0.000017	

LM = Live Moss, DM = Dead Moss, UD = Upper Duff, LD = Lower Duff

Appendix B: Gravimetric Moisture Content Data for FTWW1-3 and FTWW2000

1999 Gravimetric Fuel Moisture Content Data for Plot FTWW1

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
4/27				400	44	9	606	134	9			
5/6	267	82	8	360	73	9	418	130	9			
5/11	121	124	9	286	120	9	419	152	9			
5/13	64	38	9	259	101	9	339	99	8			
5/17	42	16	9	216	101	8	228	228	7			
5/20	26	6	6	139	100	6	248	108	6			
5/25	19	4	9	41	14	8	159	34	8	227	63	2
5/31	23	9	9	137	80	9	242	150	9			
6/4	31	8	9	158	75	9	280	86	8			
6/8	18	3	9	32	13	8	150	68	9	191	50	7
6/12	14	4	9	33	6	9	130	41	9	184	50	2
6/15	19	3	9	39	11	9	104	52	8	205	24	2
6/21	412	34	9	406	72	8	270	123	8			
6/24	131	48	9	226	50	6	226	42	8	202	39	2
6/27	18	14	9	126	71	9	191	86	7			
7/1	75	41	9	238	68	9	254	89	9			
7/7	28	7	9	84	36	9	135	41	8	188	5	2
7/12	28	3	9	56	26	9	127	42	6	221	34	4
7/15	22	8	9	62	49	9	133	57	9	191	24	5
7/19	197	45	9	250	65	9	201	78	9			
7/22	453	66	9	331	53	9	209	75	8			
7/28	436	122	9	375	102	9	279	105	7	222	63	2
8/4	247	82	9	326	45	8	256	56	9	247	48	3

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
8/11	457	64	9	389	51	8	253	56	9	188	30	6
8/17	170	66	8	282	44	8	236	61	6	166	64	4
8/23	47	29	9	196	36	9	182	23	7	209	31	2
8/30	282	112	9	338	99	9	229	93	6	206	42	4
9/12	179	101	9	278	64	9	191	55	9	174	18	2
9/19	280	138	9	310	69	9	168	67	9	165	28	5

1999 Gravimetric Fuel Moisture Content Data for Plot FTWW2

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
4/27				386	74	9	540	196	9			
5/3				475	89	9	478	207	9			
5/10	224	167	9	325	152	9	397	156	9			
5/13	145	171	9	270	173	9	379	196	8			
5/17	113	129	9	156	177	3	307	98	9			
5/20		47	9	191	117	9	242	72	9			
5/25	116	120	9	254	151	4	252	155	9			
5/31	75	136	9	182	132	5	256	111	4			

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
6/4	43	46	8	94	76	7	220	29	4	186	36	4
6/8	19	4	4	96	88	4	189	65	7	259	66	6
6/12	12	4	3	39	14	3	119	40	4			
6/15	14	6	9	57	50	8	104	72	7	219	49	2
6/21	273	100	9	286	36	9	173	47	8	204	56	3
6/24	69	29	7	211	55	7	201	86	6			
6/27	19	8	8	146	63	7	188	81	6	234	44	2
7/1	65	30	8	202	71	8	200	62	9			
7/7	25	13	9	145	110	7	161	89	7			
7/12	28	12	7	137	130	7	166	61	8	273	71	2
7/15	19	3	8	43	20	7	142	35	7			
7/19	168	60	9	200	57	9	148	70	8	200	6	3
7/23	300	63	9	320	38	7	184	77	9	164	28	3
7/28	425	96	9	387	64	9	319	76	8	287	99	2
8/4	163	70	8	291	64	9	239	113	4	144	48	3
8/11	421	103	7	414	68	8	265	46	7	163	22	3
8/17	190	41	4	320	75	5	154	41	3			
8/23	48	28	9	183	80	9	137	31	6	181	9	4
8/30	146	45	9	272	33	9	238	56	7	135	27	2
9/12	147	86	8	234	48	8	184	77	8	153	59	4
9/19	218	109	9	286	72	7	176	75	8	195	12	2

1999 Gravimetric Fuel Moisture Content Data for Plot FTWW3

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
4/27				453	135	9	776	208	9			
5/4	400	68	6	674	106	6	504	177	5			
5/11	159	132	8	266	111	6	309	78	6			
5/14	174	79	6	285	91	6	295	76	8			
5/18	106	95	9	261	103	9	346	122	7			
5/21	148	89	7	294	59	7	385	75	9			
5/24	132	91	7	294	39	7	319	84	6			
5/27	240	94	8	306	111	8	273	107	8	255	23	3
6/6	45	47	9	193	116	7	224	108	8			
6/9	50	20	6	194	110	6	304	70	9	279	28	2
6/16	126	56	9	134	76	9	185	63	9	256	28	3
6/23	306	41	9	330	28	9	288	32	7			
6/25	93	58	9	246	82	8	239	84	8	277	61	2
6/29	286	37	8	292	44	9	250	110	9	264	46	2
7/5	58	29	8	146	93	8	271	85	9	309	58	2
7/8	33	15	9	146	92	9	244	83	8	241	49	4
7/13	27	4	8	93	60	8	189	58	5	113	5	2
7/16	336	56	9	241	60	9	200	63	5			
7/20	305	53	9	235	48	9	144	556	7	136	42	2
7/26	467	53	7	382	80	9	261	85	6	236	12	2
7/29	416	45	7	404	54	8	256	64	7	205	68	3
8/3	361	49	9	333	44	7	268	51	9	214	24	2
8/6	89	26	9	268	65	9	218	43	9	129	11	2
8/10	438	59	9	386	41	9	309	40	7	202	48	2
8/14	405	67	8	386	52	8	291	64	9			
8/19	89	37	8	247	94	8	234	57	8	253	67	4
8/26	425	40	9	376	48	8	219	102	7	189	15	5
9/1	270	95	9	320	59	9	244	77	9	169	25	3

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
9/10	418	58	7	364	40	8	249	33	9	160	18	3
9/18	363	59	6	367	46	6	286	42	6	175	34	3

Gravimetric Fuel Moisture Content Data for Plot FTWW2000

Date	Live Moss			Dead Moss			Upper Duff			Lower Duff		
	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n	Mean	1 SD	n
5/10	151	113	6	272	83	5	425	193	6			
5/19	62	56	9	200	132	9	254	119	9			
5/30	123	49	9	281	77	9	278	82	9	357	79	3
6/7	99	137	9	213	146	9	332	94	9	327	79	7
6/16	327	46	8	337	34	8	218	106	9	314	46	5
6/21	44	37	9	108	44	9	129	80	9	200	63	9
6/26	20	4	6	72	25	6	242	88	6	294	20	2
7/12	447	92	9	325	130	8	240	56	9	256	35	9
9/6	545	62	5	462	119	5	315	41	4	294	40	4

Appendix C

1999 Fairbanks RAWS Weather and FWI

Date	Time	Temp (^oF)	RH	WSPD (mph)	ppt (in)	FFMC	DMC	DC	ISI	BUI	FWI
4/27	1200	42.0	38.0	7.0	0.00	85.0	6.0	15.0	4.7	21.7	7.9
4/28	1200	52.0	33.0	4.0	0.00	87.7	8.0	18.0	4.2	7.9	4.0
4/29	1200	58.0	32.0	4.0	0.00	89.2	10.6	21.6	5.2	10.5	5.8
4/30	1200	43.0	95.0	1.0	0.03	78.8	10.7	23.7	1.1	10.6	0.7
5/1	1200	33.0	100.0	5.0	0.01	75.0	10.7	24.8	1.1	10.7	0.7
5/2	1200	38.0	90.0	4.0	0.12	45.4	7.6	25.2	0.1	8.6	0.1
5/3	1200	38.0	100.0	5.0	0.09	29.0	5.7	28.2	0.0	7.6	0.0
5/4	1200	39.0	49.0	9.0	0.00	54.6	6.4	31.3	0.6	8.4	0.3
5/5	1200	47.0	56.0	7.0	0.00	70.7	7.5	35.2	1.1	9.8	0.7
5/6	1200	57.0	43.0	4.0	0.00	81.6	9.7	40.1	1.9	12.1	1.8
5/7	1200	46.0	83.0	4.0	0.00	81.1	10.1	43.9	1.8	12.8	1.7
5/8	1200	56.0	59.0	4.0	0.01	83.3	11.7	48.7	2.3	14.6	2.9
5/9	1200	61.0	37.0	4.0	0.00	87.4	14.6	54.0	4.1	17.4	6.1
5/10	1200	67.0	25.0	5.0	0.00	91.1	18.7	59.9	7.5	21.0	11.5
5/11	1200	66.0	33.0	4.0	0.00	91.1	22.2	65.7	6.9	24.1	11.6
5/12	1200	73.0	34.0	5.0	0.00	91.1	26.3	72.2	7.5	27.6	13.2
5/13	1200	66.0	53.0	5.0	0.02	88.3	28.8	78.0	5.0	29.9	10.0
5/14	1200	69.0	50.0	2.0	0.06	80.1	30.9	84.1	1.3	32.2	2.8
5/15	1200	71.0	27.0	6.0	0.00	89.8	35.3	90.4	6.8	35.7	14.0
5/16	1200	66.0	35.0	4.0	0.00	89.9	38.7	96.2	5.8	38.7	13.0
5/17	1200	63.0	41.0	5.0	0.00	89.9	41.5	101.7	6.3	41.5	14.4
5/18	1200	56.0	28.0	7.0	0.00	90.3	44.2	106.5	7.9	44.2	17.5
5/19	1200	65.0	26.0	5.0	0.00	91.4	48.0	112.2	7.8	47.9	18.2
5/20	1200	63.0	30.0	6.0	0.00	91.4	51.4	117.7	8.5	51.3	20.1
5/21	1200	61.0	28.0	7.0	0.00	91.4	54.7	123.0	9.2	54.6	22.0
5/22	1200	66.0	33.0	3.0	0.00	91.4	58.2	128.8	6.7	58.1	18.0
5/23	1200	67.0	42.0	5.0	0.00	90.7	61.3	134.7	7.1	61.2	19.3

5/24	1200	72.0	35.0	4.0	0.00	90.7	65.3	141.1	6.6	65.2	18.8
5/25	1200	66.0	49.0	5.0	0.00	89.6	68.0	146.9	6.0	67.9	18.1
5/26	1200	58.0	61.0	4.0	0.31	52.5	39.5	137.2	0.3	46.0	0.5
5/27	1200	59.0	54.0	4.0	0.00	72.1	41.4	142.3	0.9	48.0	2.5
5/28	1200	57.0	59.0	1.0	0.00	78.6	43.0	147.2	1.1	49.7	3.1
5/29	1200	66.0	37.0	5.0	0.00	86.8	46.3	153.0	4.1	52.7	11.6
5/30	1200	59.0	51.0	4.0	0.02	85.7	48.4	158.1	3.2	54.8	9.7
5/31	1200	56.0	49.0	9.0	0.00	86.3	50.3	162.9	5.2	56.8	14.6
6/1	1200	62.0	53.0	4.0	0.00	86.3	52.5	168.3	3.5	59.0	10.9
6/2	1200	55.0	67.0	5.0	0.01	85.4	53.7	174.0	3.3	60.6	10.7
6/3	1200	56.0	61.0	4.0	0.00	85.4	55.2	179.8	3.1	62.4	10.2
6/4	1200	62.0	45.0	5.0	0.00	87.1	57.8	186.2	4.2	65.1	13.4
Date	**Time**	**Temp (^oF)**	**RH**	**WSPD (mph)**	**ppt (in)**	**FFMC**	**DMC**	**DC**	**ISI**	**BUI**	**FWI**
6/5	1200	69.0	35.0	4.0	0.00	89.5	61.5	193.3	5.5	68.5	17.0
6/6	1200	77.0	40.0	3.0	0.00	89.9	65.6	201.2	5.4	72.3	17.2
6/7	1200	79.0	36.0	3.0	0.00	90.8	70.2	209.3	6.1	76.4	19.4
6/8	1200	76.0	50.0	2.0	0.00	90.1	73.6	217.1	5.0	79.7	17.3
6/9	1200	75.0	48.0	5.0	0.00	90.0	77.0	224.8	6.4	83.0	21.0
6/10	1200	81.0	39.0	3.0	0.00	90.5	81.5	233.1	5.8	87.0	20.2
6/11	1200	82.0	33.0	3.0	0.00	91.6	86.6	241.5	6.9	91.3	23.3
6/12	1200	84.0	34.0	3.0	0.00	91.8	91.8	250.1	7.0	95.7	24.2
6/13	1200	90.0	36.0	4.0	0.00	92.0	97.4	259.3	7.8	100.5	26.7
6/14	1200	68.0	64.0	0.0	0.00	88.6	99.4	266.3	3.5	102.8	15.0
6/15	1200	82.0	47.0	0.0	0.00	89.0	103.4	274.7	3.7	106.6	16.1
6/16	1200	73.0	76.0	3.0	0.03	82.9	104.9	282.2	2.0	108.7	10.0
6/17	1200	59.0	100.0	0.0	0.13	40.3	74.4	282.5	0.0	89.7	0.1
6/18	1200	67.0	69.0	6.0	0.40	44.8	40.4	261.8	0.1	58.3	0.2
6/19	1200	72.0	57.0	5.0	0.00	73.1	43.0	269.2	1.0	61.5	3.6
6/20	1200	71.0	77.0	0.0	0.00	76.6	44.4	276.5	0.8	63.3	2.8
6/21	1200	67.0	69.0	1.0	0.43	42.0	23.6	253.9	0.1	38.3	0.1
6/22	1200	60.0	100.0	4.0	0.00	42.0	23.6	260.1	0.1	38.5	0.1
6/23	1200	66.0	80.0	1.0	0.00	55.7	24.7	266.9	0.3	40.1	0.5
6/24	1200	76.0	62.0	1.0	0.00	73.8	27.3	274.7	0.8	43.7	1.7

6/25	1200	81.0	47.0	2.0	0.00	85.6	31.3	283.0	2.7	49.0	7.8
6/26	1200	78.0	60.0	2.0	0.00	86.3	34.1	291.0	3.0	52.8	8.9
6/27	1200	70.0	74.0	6.0	0.00	85.2	35.6	298.2	3.5	54.9	10.5
6/28	1200	62.0	78.0	6.0	1.16	38.5	13.0	218.4	0.0	22.7	0.0
6/29	1200	71.0	42.0	8.0	0.00	76.3	16.5	225.7	1.6	27.9	3.0
6/30	1200	74.0	33.0	9.0	0.00	88.8	20.8	233.3	7.4	34.0	14.7
7/1	1200	80.0	33.0	2.0	0.00	91.1	25.7	241.5	5.9	40.6	13.4
7/2	1200	81.0	48.0	2.0	0.00	90.7	29.2	250.1	5.5	45.2	13.6
7/3	1200	84.0	47.0	5.0	0.00	90.7	32.9	259.0	7.1	50.0	17.3
7/4	1200	85.0	51.0	4.0	0.00	90.4	36.4	268.0	6.3	54.4	16.5
7/5	1200	77.0	68.0	3.0	0.02	86.9	38.4	276.2	3.5	56.9	10.7
7/6	1200	76.0	53.0	6.0	0.00	87.5	41.2	284.3	4.8	60.5	14.3
7/7	1200	76.0	55.0	5.0	0.00	87.5	43.9	292.4	4.5	63.8	14.0
7/8	1200	66.0	72.0	4.0	0.00	85.7	45.2	299.5	3.2	65.7	10.8
7/9	1200	79.0	48.0	3.0	0.00	88.1	48.5	307.9	4.1	69.6	13.8
7/10	1200	86.0	43.0	3.0	0.00	90.0	52.7	317.0	5.4	74.4	17.6
7/11	1200	72.0	75.0	3.0	0.00	86.1	54.1	324.7	3.1	76.4	11.6
7/12	1200	72.0	87.0	4.0	0.00	82.6	54.8	332.4	2.1	77.6	8.5
7/13	1200	68.0	94.0	3.0	0.00	79.2	55.1	339.7	1.3	78.4	5.6
7/14	1200	85.0	54.0	4.0	0.00	86.6	58.4	348.7	3.6	82.3	13.7
7/15	1200	81.0	60.0	3.0	0.00	86.8	61.1	357.3	3.4	85.6	13.4
7/16	1200	65.0	100.0	2.0	0.21	30.0	39.0	349.4	0.0	61.0	0.0
7/17	1200	61.0	90.0	4.0	0.34	20.4	20.9	329.1	0.0	36.1	0.0
7/18	1200	69.0	66.0	1.0	0.00	47.8	22.6	336.5	0.1	38.7	0.2
Date	**Time**	**Temp (^oF)**	**RH**	**WSPD (mph)**	**ppt (in)**	**FFMC**	**DMC**	**DC**	**ISI**	**BUI**	**FWI**
7/19	1200	67.0	82.0	2.0	0.00	60.7	23.5	343.7	0.5	40.1	0.7
7/20	1200	63.0	85.0	8.0	0.06	61.2	23.5	350.5	0.8	40.2	1.7
7/21	1200	55.0	95.0	6.0	0.02	62.5	23.7	356.5	0.8	40.6	1.4
7/22	1200	49.0	100.0	5.0	0.25	19.4	13.7	343.1	0.0	24.9	0.0
7/23	1200	57.0	74.0	4.0	0.06	39.8	14.1	349.3	0.0	25.6	0.0
7/24	1200	53.0	100.0	4.0	0.04	35.2	14.1	355.1	0.0	25.7	0.0
7/25	1200	62.0	98.0	5.0	0.21	15.8	8.4	347.0	0.0	15.8	0.0
7/26	1200	62.0	100.0	0.0	0.19	6.2	4.7	341.1	0.0	9.1	0.0

7/27	1200	59.0	100.0	3.0	0.20	2.1	2.2	334.1	0.0	4.3	0.0
7/28	1200	54.0	98.0	3.0	0.05	3.1	2.3	340.0	0.0	4.5	0.0
7/29	1200	62.0	82.0	5.0	0.01	26.7	3.1	346.7	0.0	6.0	0.0
7/30	1200	70.0	83.0	2.0	0.05	41.7	4.0	354.2	0.1	7.8	0.0
7/31	1200	81.0	53.0	2.0	0.00	73.9	7.1	362.8	0.8	13.6	0.6
8/1	1200	65.0	95.0	2.0	0.00	74.2	7.3	369.8	0.9	14.0	0.6
8/2	1200	58.0	100.0	1.0	0.18	29.1	4.0	363.1	0.0	7.8	0.0
8/3	1200	82.0	56.0	4.0	0.00	70.7	6.6	371.1	0.9	12.7	0.6
8/4	1200	88.0	43.0	4.0	0.00	87.7	10.4	379.7	4.2	19.5	6.7
8/5	1200	83.0	48.0	2.0	0.00	88.8	13.6	387.8	4.2	24.9	7.8
8/6	1200	81.0	60.0	1.0	0.00	88.5	15.9	395.7	3.7	29.0	7.6
8/7	1200	65.0	100.0	1.0	0.23	28.6	9.2	383.5	0.0	17.3	0.0
8/8	1200	70.0	96.0	2.0	0.19	16.9	5.4	376.5	0.0	10.4	0.0
8/9	1200	63.0	100.0	1.0	0.02	16.6	5.4	382.6	0.0	10.4	0.0
8/10	1200	71.0	83.0	3.0	0.10	33.8	4.3	389.5	0.0	8.5	0.0
8/11	1200	70.0	76.0	2.0	0.05	51.1	5.4	396.3	0.2	10.4	0.1
8/12	1200	65.0	100.0	0.0	0.05	42.1	5.4	402.6	0.1	10.4	0.0
8/13	1200	64.0	80.0	7.0	0.55	35.0	2.9	356.7	0.0	5.7	0.0
8/14	1200	61.0	84.0	2.0	0.00	48.5	3.5	362.6	0.2	6.8	0.1
8/15	1200	59.0	98.0	3.0	0.01	50.2	3.6	368.3	0.2	7.0	0.1
8/16	1200	68.0	71.0	3.0	0.00	68.1	4.9	374.9	0.8	9.4	0.4
8/17	1200	71.0	68.0	3.0	0.00	78.2	6.4	381.8	1.2	12.3	0.8
8/18	1200	71.0	72.0	2.0	0.00	81.4	7.7	388.7	1.6	14.7	1.6
8/19	1200	69.0	76.0	1.0	0.00	82.1	8.8	395.4	1.6	16.6	1.8
8/20	1200	68.0	64.0	2.0	0.00	83.9	10.4	402.0	2.1	19.5	3.3
8/21	1200	71.0	54.0	3.0	0.00	86.1	12.6	408.9	3.1	23.3	5.6
8/22	1200	73.0	56.0	4.0	0.00	86.6	14.8	416.0	3.6	27.1	7.1
8/23	1200	66.0	71.0	2.0	0.00	85.6	16.0	422.4	2.7	29.2	5.6
8/24	1200	54.0	100.0	3.0	0.19	31.8	9.9	412.4	0.0	18.7	0.0
8/25	1200	59.0	90.0	1.0	0.01	39.9	10.2	418.1	0.0	19.3	0.0
8/26	1200	61.0	78.0	0.0	0.00	49.8	11.0	424.0	0.2	20.6	0.1
8/27	1200	58.0	86.0	0.0	0.16	29.2	7.3	417.8	0.0	14.0	0.0
8/28	1200	65.0	61.0	1.0	0.00	54.6	8.9	424.1	0.3	16.8	0.2
8/29	1200	64.0	59.0	0.0	0.00	67.7	10.5	430.3	0.6	19.8	0.5

8/30	1200	66.0	62.0	0.0	0.00	75.5	12.1	436.7	0.8	22.6	0.8
8/31	1200	65.0	59.0	0.0	0.00	80.3	13.7	443.0	1.2	25.5	1.8
Date	**Time**	**Temp (^oF)**	**RH**	**WSPD (mph)**	**ppt (in)**	**FFMC**	**DMC**	**DC**	**ISI**	**BUI**	**FWI**
9/1	1200	53.0	100.0	0.0	0.03	73.5	13.7	448.1	0.7	25.5	0.8
9/2	1200	66.0	70.0	0.0	0.02	76.3	14.8	453.2	0.8	27.3	0.9
9/3	1200	48.0	100.0	3.0	0.20	27.7	8.9	438.9	0.0	17.0	0.0
9/4	1200	54.0	95.0	3.0	0.14	19.4	5.7	433.0	0.0	11.1	0.0
9/5	1200	61.0	74.0	0.0	0.00	33.8	6.5	437.6	0.0	12.5	0.0
9/6	1200	62.0	72.0	0.0	0.00	47.5	7.4	442.3	0.1	14.2	0.1
9/7	1200	63.0	64.0	0.0	0.00	61.2	8.6	447.1	0.4	16.4	0.4
9/8	1200	68.0	46.0	5.0	0.00	80.5	10.6	452.4	1.8	20.1	2.7
9/9	1200	66.0	42.0	5.0	0.00	86.5	12.7	457.5	3.9	23.7	7.0
9/10	1200	66.0	51.0	0.0	0.00	86.8	14.4	462.6	2.7	26.8	5.3
9/11	1200	70.0	49.0	0.0	0.00	87.4	16.4	468.1	2.9	30.2	6.2
9/12	1200	70.0	43.0	1.0	0.00	88.4	18.7	473.6	3.7	34.0	8.2
9/13	1200	51.0	100.0	1.0	0.10	50.5	15.0	477.2	0.2	27.8	0.2
9/14	1200	65.0	68.0	1.0	0.14	47.9	11.4	471.4	0.1	21.5	0.1
9/15	1200	57.0	75.0	0.0	0.00	56.7	12.1	475.6	0.3	22.7	0.3
9/16	1200	62.0	62.0	2.0	0.00	71.7	13.3	480.3	0.8	24.9	0.8
9/17	1200	60.0	62.0	5.0	0.00	79.7	14.4	484.8	1.6	26.9	3.1
9/18	1200	71.0	39.0	4.0	0.00	87.4	16.9	490.4	4.0	31.1	8.5
9/19	1200	64.0	46.0	0.0	0.00	87.6	18.7	495.3	3.0	34.2	6.9
9/20	1200	66.0	44.0	4.0	0.00	88.1	20.7	500.4	4.5	37.5	10.3
9/21	1200	51.0	64.0	1.0	0.00	86.5	21.4	504.0	2.8	38.8	7.0
9/22	1200	42.0	100.0	6.0	0.14	39.8	15.3	495.2	0.1	28.4	0.1
9/23	1200	43.0	100.0	0.0	0.13	20.2	10.9	488.1	0.0	20.6	0.0
9/24	1200	39.0	100.0	3.0	0.08	14.2	9.1	490.5	0.0	17.4	0.0

2000 Fairbanks RAWS Weather and FWI

Date	Time	Temp (^oF)	RH	WSPD (mph)	ppt (in)	FFMC	DMC	DC	ISI	BUI	FWI
5/14	1200					85.0	6	15			
5/15	1200	58	18	9	0.00	91.2	9.4	20	10.5	9.3	10.2
5/16	1200	64	19	3	0.00	92.8	13.4	25.6	8.1	13.3	9.7
5/17	1200	63	21	2	0.00	92.8	17.2	31.1	7.5	17	10.3
5/18	1200	61	28	4	0.00	92.6	20.5	36.4	8.5	20.3	12.5
5/19	1200	65	27	2	0.00	92.6	24.2	42.1	7.3	24	12
5/20	1200	43	100	4	0.41	20.4	11.7	29.8	0	11.8	0
5/21	1200	55	43	2	0.23	40.3	8.6	27	0	9.6	0
5/22	1200	50	68	2	0.07	48.1	8.4	31.2	0.2	10	0.1
5/23	1200	59	34	3	0.00	73.7	11.2	36.3	0.9	12.6	0.6
5/24	1200	40	99	3	0.37	18.3	5.4	25.7	0	7.1	0
5/25	1200	54	28	4	0.21	47.4	5.1	23.7	0.2	6.7	0.1
5/26	1200	53	27	4	0.00	73.3	7.6	28.2	1	9.1	0.6
5/27	1200	54	35	4	0.00	83.3	9.9	32.8	2.3	11.3	2.4
5/28	1200	60	30	6	0.00	88.6	12.9	38	5.7	14	7.3
5/29	1200	63	26	3	0.09	79.4	14	43.5	1.4	15.5	1.3
5/30	1200	66	23	3	0.00	89.2	18	49.3	4.9	18.9	7.5
5/31	1200	56	78	6	0.10	64.7	15.3	54.1	0.8	17.9	0.7
6/1	1200	69	31	4	0.01	84.5	19.2	61.2	2.7	21.5	4.6
6/2	1200	59	50	3	0.05	79.3	21.3	67.3	1.4	23.8	2.1
6/3	1200	69	31	1	0.00	87.6	25.3	74.4	3.3	27.3	6.5
6/4	1200	71	26	4	0.00	91.4	29.7	81.7	7.2	31.1	13.6
6/5	1200	74	20	4	0.00	93.5	34.8	89.4	9.7	35.3	18.3
6/6	1200	84	15	4	0.00	95.7	41.5	98	13.3	41.5	24.7
6/7	1200	74	28	3	0.00	94.4	46.2	105.6	10.1	46.1	21.5
6/8	1200	73	27	3	0.00	93.9	50.8	113.1	9.5	50.7	21.7
6/9	1200	73	41	4	0.00	91.8	54.5	120.6	7.6	54.4	19.1
6/10	1200	80	25	2	0.00	93.1	60	128.8	7.8	59.8	20.4
6/11	1200	76	25	3	0.00	93.1	65	136.6	8.5	64.9	22.7

6/12	1200	84	17	1	0.00	95.2	71.6	145.2	9.6	71.4	25.9
6/13	1200	78	26	4	0.00	94.6	76.7	153.2	11.4	76.6	30.1
6/14	1200	66	45	4	0.04	86.2	79.6	160	3.4	79.4	12.9
6/15	1200	61	53	4	0.34	55.5	45.6	149.3	0.4	51.7	0.7
6/16	1200	66	39	2	0.00	77.5	48.8	156.1	1.1	54.8	3.3
6/17	1200	73	32	3	0.00	88.2	53.1	163.6	4.2	58.6	12.7
6/18	1200	65	53	6	0.00	88.2	55.5	170.3	5.4	61.2	15.7
6/19	1200	69	35	2	0.00	89.7	59.2	177.5	4.8	64.6	14.9
6/20	1200	68	28	4	0.00	91.2	63.2	184.5	7	68.1	20.2
6/21	1200	73	30	1	0.00	91.5	67.6	192	5.8	71.9	18.1
6/22	1200	78	34	2	0.10	81.6	60.5	200	1.6	68.9	6.1
6/23	1200	82	23	1	0.02	91.6	66.3	208.4	5.9	73.9	18.6
6/24	1200	85	18	1	0.00	94.8	72.9	217.1	9.2	79.3	26.5
6/25	1200	83	23	4	0.00	94.9	78.9	225.6	11.8	84.2	32.3
Date	**Time**	**Temp (^oF)**	**RH**	**WSPD (mph)**	**ppt (in)**	**FFMC**	**DMC**	**DC**	**ISI**	**BUI**	**FWI**
6/26	1200	77	33	4	0.00	93.4	83.5	233.5	9.6	88.2	28.9
6/27	1200	73	32	2	0.00	93.0	87.8	241	7.7	91.9	25.2
6/28	1200	72	40	3	0.00	91.7	91.5	248.4	6.9	95.2	23.9
6/29	1200	61	75	2	0.29	45.8	52.9	237.3	0.1	67.9	0.2
6/30	1200	73	30	2	0.00	78.5	57.3	244.8	1.2	72.3	4.5
7/1	1200	71	39	4	0.00	87.1	60.5	252.4	3.9	75.7	13.8
7/2	1200	70	52	2	0.00	87.2	63	259.9	3.4	78.5	12.6
7/3	1200	59	86	1	0.16	46.5	44.8	258.5	0.1	62.6	0.2
7/4	1200	78	37	3	0.04	78.1	48.8	266.8	1.2	67	4.5
7/5	1200	61	80	3	0.00	79.5	49.6	273.4	1.4	68.2	5.2
7/6	1200	73	33	3	0.00	88.5	53.4	281.2	4.4	72.4	14.8
7/7	1200	78	36	2	0.00	90.4	57.4	289.5	5.3	76.7	17.7
7/8	1200	83	37	3	0.00	91.0	61.7	298.3	6.3	81.4	20.7
7/9	1200	67	82	2	0.07	70.7	58.2	305.5	0.8	78.9	3
7/10	1200	66	77	1	0.45	35.3	29.7	279.3	0	46.9	0
7/11	1200	69	71	3	0.02	59.8	31.2	286.7	0.5	49	0.9
7/12	1200	64	52	4	0.17	59.7	23.3	284.4	0.6	38.6	0.8
7/13	1200	61	43	4	0.00	78.2	25.6	291	1.3	41.9	3.4
7/14	1200	63	70	4	0.01	81.3	26.8	297.8	1.8	43.8	5

7/15	1200	77	40	6	0.00	88.6	30.5	306	5.7	48.9	14.4
7/16	1200	78	37	1	0.00	90.2	34.5	314.3	4.8	54.1	13.4
7/17	1200	66	59	1	0.10	69.5	30.5	321.4	0.7	49.4	1.5
7/18	1200	63	49	2	0.00	80.5	32.7	328.2	1.4	52.4	4.4
7/19	1200	74	34	1	0.00	88.2	36.5	336.1	3.6	57.4	11
7/20	1200	77	29	2	0.00	91.4	40.9	344.4	6.2	63	17.7
7/21	1200	73	43	1	0.00	90.9	44.1	352.2	5.3	67.1	16.3
7/22	1200	74	42	1	0.00	90.9	47.4	360.1	5.3	71.3	16.9
7/23	1200	64	72	4	0.01	86.2	48.6	367	3.4	73.1	12.3
7/24	1200	66	58	5	0.01	86.2	50.6	374.1	3.8	75.6	13.4
7/25	1200	57	57	2	0.01	86.3	52.1	380.3	3	77.6	11.3
7/26	1200	60	41	3	0.01	87.6	54.4	386.8	3.9	80.5	14.3
7/27	1200	52	90	1	0.05	71.7	54.7	392.5	0.7	81.2	2.9
7/28	1200	64	45	2	0.01	82.2	57.2	399.4	1.7	84.2	7.5
7/29	1200	73	36	2	0.00	88.4	60.8	407.2	4	88.5	15.5
7/30	1200	76	35	1	0.00	90.3	64.7	415.3	4.9	93.1	18.3
7/31	1200	78	32	2	0.00	91.4	68.9	423.6	6.2	98	22.4
8/1	1200	74	34	2	0.00	91.5	72.2	430.8	6.2	101.8	22.9
8/2	1200	76	37	3	0.00	91.5	75.6	438.2	6.8	105.6	24.8
8/3	1200	81	33	2	0.00	91.7	79.5	446.1	6.4	110	24.4
8/4	1200	57	97	2	0.05	73.4	79.6	451.6	0.8	110.5	4.4
8/5	1200	57	69	5	0.10	62.7	65.8	457.1	0.7	96.8	3.4
8/6	1200	64	44	4	0.01	79.9	68	463.3	1.6	99.5	7.6
8/7	1200	65	45	1	0.04	80.8	70.2	469.6	1.4	102.2	6.8
8/8	1200	63	49	5	0.00	85.3	72.1	475.7	3.3	104.6	14.5
8/9	1200	56	66	1	0.01	85.2	73.2	481.1	2.3	106	11.2
Date	**Time**	**Temp (^oF)**	**RH**	**WSPD (mph)**	**ppt (in)**	**FFMC**	**DMC**	**DC**	**ISI**	**BUI**	**FWI**
8/10	1200	52	93	4	0.08	59.5	64.9	486.1	0.5	97.3	2.4
8/11	1200	52	96	3	0.09	41.2	55.7	491.1	0.1	86.8	0.1
8/12	1200	60	100	4	0.39	8.5	28.7	452.8	0	49.6	0
8/13	1200	57	100	5	0.52	0.7	12.6	403.1	0	23.4	0
8/14	1200	49	71	4	0.18	23.3	8.3	394.4	0	15.9	0
8/15	1200	61	35	7	0.00	65.2	10.7	400.3	0.9	20	0.8
8/16	1200	65	29	1	0.00	82.2	13.5	406.6	1.6	24.9	2.8

8/17	1200	54	64	2	0.00	83.0	14.5	411.8	1.9	26.6	3.7
8/18	1200	52	96	5	0.49	21.9	6.8	369.8	0	13	0
8/19	1200	53	62	1	0.03	42.4	7.8	374.9	0.1	14.8	0
8/20	1200	58	45	0	0.01	61.3	9.6	380.5	0.4	18	0.4
8/21	1200	59	57	3	0.00	75.0	11	386.2	1	20.5	0.9
8/22	1200	49	80	5	0.01	77.2	11.4	390.9	1.3	21.3	1.8
8/23	1200	51	68	1	0.27	41.0	6.8	373.3	0	13	0
8/24	1200	56	59	3	0.00	62.6	8	378.7	0.6	15.2	0.5
8/25	1200	46	97	4	0.33	19.2	3.8	355.2	0	7.5	0
8/26	1200	51	53	2	0.15	36.9	3	351.2	0	5.8	0
8/27	1200	66	31	3	0.00	72.3	5.8	357.6	0.9	11.1	0.6
8/28	1200	69	35	2	0.00	85.1	8.7	364.3	2.5	16.4	3.6
8/29	1200	62	43	2	0.00	87.1	10.8	370.3	3.3	20.1	5.4
8/30	1200	53	85	4	0.65	30.5	5.1	318	0	9.7	0
8/31	1200	64	50	6	0.00	65.7	7	324.2	0.9	13.3	0.6
9/1	1200	56	63	1	0.00	74.2	8	328.3	0.8	15	0.6
9/2	1200	61	52	3	0.49	49.5	4.9	294.3	0.2	9.5	0.1
9/3	1200	60	48	2	0.00	70.6	6.5	298.8	0.8	12.3	0.5
9/4	1200	58	59	2	0.00	78.5	7.6	303.1	1.2	14.3	0.9
9/5	1200	50	68	1	0.00	80.3	8.2	306.6	1.3	15.5	1
9/6	1200	51	76	3	0.00	80.7	8.7	310.2	1.6	16.3	1.8

Appendix D

5/9/00	Wet Wt (g)	Dry Wt. (g)	Sam. Vol. (cm^3)	Vol MC	BD	Fuel Type	Probe Depth	Volts (Wet)	Volts (Dry)
sam 1	146.6	28.4	1032	0.115	0.028	upper duff	15 cm	0.186	0.002
sam 2	192.9	31.6	516	0.313	0.061	upper duff	22 cm	0.573	0.007
sam 3	149.8	26.1	1032	0.120	0.025	upper duff	15 cm	0.181	0.002

FDR Probe Calibration Data

Mean wet voltage at 15 cm = 0.184 Mean wet voltage at 22 cm = 0.573

Mean dry voltage at 15 cm = 0.002 Mean dry voltage at 22 cm = 0.007

Step 1. Find the dielectric constant ($\sqrt{\varepsilon}$) for the mean wet voltage (0.184 and 0.573) with the following equation:

$$\sqrt{\varepsilon_w} = 1.07 + 6.4V - 6.4V^2 + 4.7V^3$$

where:

$\sqrt{\varepsilon_w} = 2.060$ at 15 cm $\sqrt{\varepsilon_w} = 3.520$ at 22 cm

Step 2. Repeat step 1 with the mean dry voltage (0.002 and 0.007). The resulting dielectric constant will be the a_0 parameter in the volumetric moisture content equation.

where:

$\sqrt{\varepsilon_d} = a_0 = 1.083$ at 15 cm $\sqrt{\varepsilon_d} = a_0 = 1.115$ at 22 cm

Mean $a_0 = 1.13$

Step 3. The a_1 parameter in the volumetric moisture content equation is derived from the wet and dry dielectric constants and the true volumetric moisture content of the sample:

$$a_1 = \frac{\sqrt{\varepsilon_w} - \sqrt{\varepsilon_d}}{\theta}$$

where:

a_1 = 8.35 at 15 cm a_1 = 7.71 at 22 cm

Mean a_1 = 8.03

Step 4. Using the mean a_0 and a_1 found is steps 2 and 3, find the volumetric moisture content (θ) from the following equation:

$$\theta = \frac{[1.07 + 6.4V - 6.4V^2 + 4.7V^3] - a_0}{a_1}$$

θ = 12% at 15 cm, true volumetric moisture content was 11.75% (see table at top of page).

θ = 30% at 22 cm, true volumetric moisture content was 31% (see table at top of page).

Appendix E

Delta-T Organic Soil Moisture Calibration Compared to the Custom Boreal Forest Calibration and Destructively Sampled Volumetric Moisture Contents. Volumetric moisture contents (%) computed from voltage readings using the Delta-T preprogrammed organic soil moisture (OSM) parameters and the custom parameters derived in this study from data collected at Ft. Wainwright, AK 2000. Table denotes means ± 1SD.

Date	0 – 5 cm			5 – 10 cm			10 – 15 cm			15 – 20 cm			20+cm		
	Actual	Custom	OSM	Actual	Custom	OSM	Actual	Custom	OSM	Actual	Custom	OSM	Actual	Custom	OSM
5/19/00	2.17 ± 1.30	4.20 ± 2.10	1.80 ± 0.40	6.54 ± 2.82	NA	NA	7.78 ±3.52	6.37 ± 2.80	4.00 ± 0.30	10.16 ± 5.07	NA	NA	NA	37.93 ± 11.60	36.9 ± 9.50
5/30/00	3.36 ± 1.95	3.17 ± 1.20	0.70 ± 1.40	6.32 ± 1.55	6.13 ± 1.90	3.80 ± 0.60	9.85 ± 4.31	7.11 ± 3.00	4.80 ± 0.50	15.25 ± 8.27	13.38 ± 5.10	11.30 ± 2.80	34.28 ± 15.10	30.55 ± 11.60	29.3 ± 9.40
6/16/00	4.87 ± 0.77	3.96 ± 1.20	1.50 ± 1.30	5.04 ± 1.25	4.35 ± 1.50	1.90 ± 0.01	7.34 ± 2.62	6.86 ± 3.10	4.50 ± .060	12.61 ± 4.86	12.60 ± 8.40	10.50 ± 6.20	14.27 ± 2.11	52.07 ± 6.50	51.70 ± 4.20
6/21/00	0.81 ± 0.37	1.47 ± 0.90	-1.10 ± 1.70	2.53 ± 0.63	2.60 ± 0.80	0.10 ± 1.80	3.33 ± 1.12	4.17 ± 1.90	1.70 ± 0.60	9.99 ± 7.01	11.28 ± 7.70	9.10 ± 5.40	23.12 ± 10.99	22.46 ± 13.40	20.80 ±11.30

6/26/00	0.52 ± 0.08	0.34 ± 0.00	2.30 ± 2.60	1.98 ±0.86	1.88 ± 0.10	-0.60 ± 2.60	5.39 ± 3.08	2.77 ± 1.40	0.30 ± 1.10	10.99 ± 4.38	7.56 ± 3.60	5.30 ± 1 10	23.65 ± 13.55	17.39 ± 8.90	15.50 ± 6.70
7/12/00	6.64 ± 2.47	5.60 ± 1.57	3.20 ± 1.00	6.62 ± 3.01	5.90 ± 3.86	3.50 ± 1.40	9.25 ± 7.45	9.60 ± 8.71	7.40 ± 6.50	12.53 ± 5.54	17.30 ± 13.56	15.50 ±11.50	NA	25.00 ± 18.31	23.40 ±16.50