Table 1. Growth form, common name, and scientific name of species planted onto the native vegetation subplots of the Protective Cap/Biobarrier experiment at the Idaho National Engineering and Environmental Laboratory.

Growth Form	Common Name	Scientific Name
Shrubs:		
	Basin big sagebrush	*Artemisia tridentata ssp. tridentata*
	Wyoming big sagebrush	*Artemisia tridentata ssp. wyomingensis*
	Gray rabbitbrush	*Chrysothamnus nauseosus*
	Green rabbitbrush	*Chrysothamnus viscidiflorus*
	Winterfat	*Krascheninnikovia lanata*
Perennial Grasses:		
	Bottlebrush squirreltail	*Elymus elymoides*
	Great Basin wildrye	*Leymus cinereus*
	Indian ricegrass	*Achnatherum hymenoides*
	Needle-and-thread grass	*Hesperostipa comata*
	Thick-spiked wheatgrass	*Elymus lanceolatus*
Perennial Forbs:		
	'Appar' blue flax	*Linum perenne*
	Northern sweetvetch	*Hedysarum boreale*

Table 2. Mean plant cover in the spring and fall of 1995 on soil-only, shallow-biobarrier, deep-biobarrier, and RCRA subplots planted with native vegetation in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory.

	Cover (%)	
	Spring	**Fall**
Soil Only	10	20
Shallow Biobarrier	10	21
Deep Biobarrier	13	23
RCRA	12	25

Table 3. Mean cover in 1995 and 2000 of crested wheatgrass on soil-only, shallow-biobarrier, deep-biobarrier, and RCRA subplots under ambient precipitation, summer irrigation, or fall/spring irrigation in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. Cap-type means followed by different letters, or yearly means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. In ANOVA table, significant P values are in bold typeface.

	1995	2000	**Mean**	
Ambient Precipitation		Cover (%)		
Soil Only	48	21	**35**	**a**
Shallow Biobarrier	39	21	**30**	**a**
Deep Biobarrier	37	16	**26**	**a**
RCRA	41	19	**30**	**a**
Mean	**41**	**19**		
	a	**b**		
Summer Irrigation				
Soil Only	48	25	**36**	**a**
Shallow Biobarrier	31	17	**24**	**a**
Deep Biobarrier	45	19	**32**	**a**
RCRA	46	19	**33**	**a**
Mean	**43**	**20**		
	a	**b**		
Fall/Spring Irrigation				
Soil Only	42	27	**35**	**a**
Shallow Biobarrier	37	21	**29**	**a**
Deep Biobarrier	45	23	**34**	**a**
RCRA	57	18	**37**	**a**
Mean	**45**	**22**		
	a	**b**		

Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
Ambient					
Year	1	2861.48	2861.48	21.79	**<0.001**
Cap	3	209.06	69.69	0.53	0.67
Year x Cap	3	67.82	22.61	0.17	0.91
Summer					
Year	1	3036.60	3036.60	9.68	**0.007**
Cap	3	473.46	157.82	0.50	0.69
Year x Cap	3	138.30	46.10	0.15	0.93
Fall/Spring					
Year	1	3100.60	3100.60	17.23	**<0.001**
Cap	3	221.44	73.81	0.41	0.75
Year x Cap	3	533.35	177.78	0.99	0.42

Table 4. Mean end-of-season soil moisture content (%) in the entire soil profile for each cap-type/vegetation combination under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995						
Crested	14.3	15.0	13.3	12.5	**13.8**	**a**
Native	14.3	13.6	14.1	13.8	**13.9**	**a**
Mean	**14.3**	**14.3**	**13.7**	**13.1**		
	a	**a**	**a**	**a**		
1996						
Crested	15.2	15.4	14.5	13.6	**14.7**	**a**
Native	15.5	15.0	15.1	14.7	**15.1**	**a**
Mean	**15.3**	**15.2**	**14.8**	**14.2**		
	a	**a**	**a**	**a**		
1997						
Crested	15.5	15.7	15.1	15.0	**15.3**	**a**
Native	15.6	15.3	15.4	15.8	**15.5**	**a**
Mean	**15.5**	**15.5**	**15.2**	**15.4**		
	a	**a**	**a**	**a**		
1998						
Crested	15.6	15.4	16.3	14.8	**15.5**	**a**
Native	15.8	14.9	15.3	15.6	**15.4**	**a**
Mean	**15.7**	**15.2**	**15.8**	**15.2**		
	a	**a**	**a**	**a**		
1999						
Crested	18.2	15.5	17.6	16.3	**16.9**	**a**
Native	16.3	14.4	15.4	14.4	**15.1**	**a**
Mean	**17.2**	**15.0**	**16.5**	**15.4**		
	a	**a**	**a**	**a**		
2000						
Crested	16.7	15.3	16.0	14.2	**15.5**	**a**
Native	15.3	14.6	14.9	15.1	**15.0**	**a**
Mean	**16.0**	**14.9**	**15.4**	**14.6**		
	a	**a**	**a**	**a**		

Table 4 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	3	5.583	1.861	1.744	0.198
Vegetation	1	0.170	0.170	0.159	0.695
Cap x Vegetation	3	6.449	2.150	2.014	0.153
1996					
Cap	3	5.000	1.667	1.063	0.392
Vegetation	1	0.917	0.917	0.585	0.456
Cap x Vegetation	3	1.849	0.616	0.393	0.760
1997					
Cap	3	0.301	0.100	0.046	0.986
Vegetation	1	0.140	0.140	0.064	0.804
Cap x Vegetation	3	1.068	0.356	0.163	0.920
1998					
Cap	3	1.856	0.619	0.278	0.840
Vegetation	1	0.0771	0.0771	0.035	0.855
Cap x Vegetation	3	2.720	0.907	0.407	0.750
1999					
Cap	3	19.43	6.476	1.291	0.311
Vegetation	1	18.90	18.90	3.770	0.070
Cap x Vegetation	3	0.986	0.329	0.066	0.977
2000					
Cap	3	6.982	2.327	1.539	0.243
Vegetation	1	1.967	1.967	1.301	0.271
Cap x Vegetation	3	4.836	1.612	1.066	0.391

Table 4 (continued).

B. Summer Irrigation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995						
Crested	13.7	16.5	12.6	15.1	**14.5**	**a**
Native	13.4	13.8	13.5	14.3	**13.8**	**a**
Mean	**13.6**	**15.1**	**13.1**	**14.7**		
	a	**a**	**a**	**a**		
1996						
Crested	17.9	16.6	17.4	21.5	**18.3**	**a**
Native	16.1	16.6	16.1	17.9	**16.7**	**b**
Mean	**17.0**	**16.6**	**16.8**	**19.7**		
	ab	**a**	**ab**	**b**		
1997						
Crested	17.8	17.6	18.3	22.4	**19.0**	**a**
Native	16.1	16.1	15.8	16.4	**16.1**	**b**
Mean	**16.9**	**16.9**	**17.0**	**19.4**		
	a	**a**	**a**	**b**		
1998						
Crested	18.3	17.9	19.2	22.2	**19.4**	**a**
Native	16.2	16.1	16.2	16.3	**16.2**	**b**
Mean	**17.2**	**17.0**	**17.7**	**19.3**		
	a	**a**	**a**	**a**		
1999						
Crested	18.1	17.1	18.3	21.1	**18.6**	**a**
Native	15.8	16.2	14.7	15.6	**15.5**	**b**
Mean	**16.9**	**16.6**	**16.5**	**18.4**		
	a	**a**	**a**	**a**		
2000						
Crested	17.3	17.0	17.7	19.2	**17.8**	**a**
Native	15.5	15.8	15.4	16.6	**15.8**	**b**
Mean	**16.4**	**16.4**	**16.6**	**17.9**		
	a	**a**	**a**	**a**		

Table 4 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	3	16.98	5.658	1.239	0.328
Vegetation	1	3.096	3.096	0.978	0.422
Cap x Vegetation	3	9.573	3.191	0.699	0.566
1996					
Cap	3	39.26	13.09	4.015	**0.026**
Vegetation	1	16.06	16.06	4.926	**0.041**
Cap x Vegetation	3	9.758	3.253	0.998	0.419
1997					
Cap	3	27.49	9.164	7.384	**0.003**
Vegetation	1	51.16	51.16	41.222	**<0.001**
Cap x Vegetation	3	19.47	6.490	5.230	**0.010**
1998					
Cap	3	18.67	6.222	2.992	0.062
Vegetation	1	61.25	61.25	29.455	**<0.001**
Cap x Vegetation	3	15.81	5.270	2.534	0.094
1999					
Cap	3	13.76	4.586	1.217	0.336
Vegetation	1	56.70	56.70	15.055	**0.001**
Cap x Vegetation	3	17.09	5.696	1.512	0.250
2000					
Cap	3	9.044	3.015	1.029	0.406
Vegetation	1	23.74	23.74	8.104	**0.012**
Cap x Vegetation	3	1.654	0.551	0.188	0.903

Table 4 (continued)

C. Fall/Spring Irrigation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995						
Crested	23.0	22.3	23.8	20.6	**22.4**	**a**
Native	22.8	22.8	21.5	22.5	**22.4**	**a**
Mean	**22.9**	**22.6**	**22.7**	**21.6**		
	a	**a**	**a**	**a**		
1996						
Crested	15.8	20.8	21.2	15.9	**18.4**	**a**
Native	20.7	20.0	19.1	18.5	**19.6**	**a**
Mean	**18.2**	**20.4**	**20.2**	**17.2**		
	a	**a**	**a**	**a**		
1997						
Crested	15.8	20.8	17.3	17.6	**17.9**	**a**
Native	16.1	16.2	15.0	15.5	**15.7**	**b**
Mean	**16.0**	**18.5**	**16.1**	**16.6**		
	a	**a**	**a**	**a**		
1998						
Crested	18.2	20.6	17.7	17.1	**18.4**	**a**
Native	15.7	16.3	14.5	15.4	**15.5**	**b**
Mean	**16.9**	**18.5**	**16.1**	**16.2**		
	a	**a**	**a**	**a**		
1999						
Crested	21.5	23.6	22.1	16.1	**20.9**	**a**
Native	15.7	15.7	15.2	16.9	**15.9**	**b**
Mean	**18.6**	**19.6**	**18.6**	**16.5**		
	a	**a**	**a**	**a**		
2000						
Crested	17.8	22.3	18.0	15.5	**18.4**	**a**
Native	15.1	15.4	14.7	14.5	**14.9**	**b**
Mean	**16.4**	**18.8**	**16.3**	**15.0**		
	a	**b**	**a**	**a**		

Table 4 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	3	6.335	2.112	0.549	0.656
Vegetation	1	0.0121	0.0121	0.003	0.956
Cap x Vegetation	3	14.58	4.860	1.264	0.320
1996					
Cap	3	43.56	14.52	0.492	0.693
Vegetation	1	7.993	7.993	0.271	0.610
Cap x Vegetation	3	46.11	15.37	0.521	0.674
1997					
Cap	3	24.04	8.012	2.490	0.097
Vegetation	1	28.45	28.45	8.843	**0.009**
Cap x Vegetation	3	18.26	6.087	1.892	0.172
1998					
Cap	3	21.14	7.045	2.280	0.119
Vegetation	1	51.16	51.16	16.553	**<0.001**
Cap x Vegetation	3	5.476	1.825	0.591	0.630
1999					
Cap	3	31.28	10.43	2.947	0.064
Vegetation	1	149.6	149.6	42.279	**<0.001**
Cap x Vegetation	3	70.05	23.35	6.601	**0.004**
2000					
Cap	3	46.85	15.62	9.008	**<0.001**
Vegetation	1	71.48	71.48	41.229	**<0.001**
Cap x Vegetation	3	27.74	9.248	5.334	**0.010**

Table 5. Estimates of mean evapotranspiration (mm) for each cap-type/vegetation combination under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995						
Crested	355	342	349	329	**344**	**a**
Native	320	319	353	334	**332**	**a**
Mean	**338**	**331**	**351**	**331**		
	a	**a**	**a**	**a**		
1996						
Crested	156	152	155	140	**151**	**a**
Native	140	119	142	178	**144**	**a**
Mean	**148**	**135**	**148**	**159**		
	a	**a**	**a**	**a**		
1997						
Crested	220	211	198	211	**210**	**a**
Native	231	211	232	225	**225**	**a**
Mean	**225**	**211**	**215**	**218**		
	a	**a**	**a**	**a**		
1998						
Crested	190	188	190	189	**189**	**a**
Native	175	185	186	242	**196**	**a**
Mean	**183**	**187**	**188**	**215**		
	a	**a**	**a**	**a**		
1999						
Crested	248	219	211	176	**214**	**a**
Native	232	233	208	242	**229**	**a**
Mean	**240**	**226**	**210**	**209**		
	a	**a**	**a**	**a**		
2000						
Crested	119	109	135	120	**121**	**a**
Native	108	104	106	103	**105**	**a**
Mean	**113**	**106**	**121**	**112**		
	a	**a**	**a**	**a**		

Table 5 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	3	1622	541.0	0.421	0.741
Vegetation	1	858.6	858.6	0.668	0.426
Cap x Vegetation	3	1756	585.4	0.455	0.717
1996					
Cap	3	1667	555.7	0.891	0.467
Vegetation	1	243.2	243.2	0.390	0.541
Cap x Vegetation	3	4187	1395	2.238	0.123
1997					
Cap	3	665.2	221.7	0.448	0.722
Vegetation	1	1270	1270	2.568	0.129
Cap x Vegetation	3	920.1	306.7	0.620	0.612
1998					
Cap	3	3976	1325	1.287	0.313
Vegetation	1	348.5	348.5	0.338	0.569
Cap x Vegetation	3	4250	1416	1.376	0.286
1999					
Cap	3	3897	1299	0.367	0.778
Vegetation	1	1368	1368	0.387	0.543
Cap x Vegetation	3	5813	1937	0.548	0.657
2000					
Cap	3	620.4	206.8	0.407	0.750
Vegetation	1	1518	1518	2.987	0.103
Cap x Vegetation	3	470.5	156.8	0.309	0.819

Table 5 (continued).

B. Summer Irrigation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995						
Crested	362	299	377	332	**342**	**a**
Native	334	310	332	292	**317**	**a**
Mean	**348**	**304**	**354**	**312**		
	a	**a**	**a**	**a**		
1996						
Crested	372	428	409	387	**399**	**a**
Native	424	396	407	423	**412**	**a**
Mean	**398**	**412**	**408**	**405**		
	a	**a**	**a**	**a**		
1997						
Crested	399	396	417	389	**400**	**a**
Native	428	396	412	419	**414**	**a**
Mean	**414**	**396**	**415**	**404**		
	a	**a**	**a**	**a**		
1998						
Crested	344	353	357	361	**354**	**a**
Native	372	369	359	406	**376**	**a**
Mean	**358**	**361**	**358**	**384**		
	a	**a**	**a**	**a**		
1999						
Crested	341	360	370	374	**361**	**a**
Native	385	424	407	413	**407**	**b**
Mean	**363**	**392**	**389**	**394**		
	a	**a**	**a**	**a**		
2000						
Crested	324	325	326	344	**330**	**a**
Native	317	327	354	318	**329**	**a**
Mean	**321**	**326**	**340**	**331**		
	a	**a**	**a**	**a**		

Table 5 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	3	11375	3791	3.864	**0.030**
Vegetation	1	3805	3805	3.879	0.066
Cap x Vegetation	3	2953	984.3	1.003	0.417
1996					
Cap	3	652.5	217.5	0.109	0.954
Vegetation	1	1060	1060	0.532	0.476
Cap x Vegetation	3	6411	2137	1.072	0.389
1997					
Cap	3	1349	450.0	0.562	0.648
Vegetation	1	1132	1132	1.413	0.252
Cap x Vegetation	3	1514	504.7	0.630	0.606
1998					
Cap	3	2750	916.7	1.045	0.400
Vegetation	1	3023	3023	3.445	0.082
Cap x Vegetation	3	1497	499.1	0.569	0.644
1999					
Cap	3	3745	1248	0.481	0.700
Vegetation	1	12578	12578	4.842	**0.043**
Cap x Vegetation	3	671.0	223.7	0.086	0.967
2000					
Cap	3	1232	411.0	0.975	0.429
Vegetation	1	2.338	2.338	0.006	0.942
Cap x Vegetation	3	2291	764.0	1.812	0.186

Table 5 (continued).

C. Fall/Spring Irrigation

	Soil Only	Shallow Biobarrier	Deep Biobarrier	RCRA	**Mean**	
1995*						
Crested	710	687	681	818	**724**	
Native	784	719	818	777	**775**	
Mean	**747**	**703**	**749**	**798**		
1996*						
Crested	262	198	208	179	**212**	
Native	250	244	259	200	**238**	
Mean	**256**	**221**	**234**	**190**		
1997						
Crested	444	317	397	375	**384**	**a**
Native	399	375	382	334	**373**	**a**
Mean	**422**	**346**	**390**	**355**		
	a	**a**	**a**	**a**		
1998						
Crested	247	245	225	233	**238**	**a**
Native	296	229	267	251	**261**	**b**
Mean	**272**	**237**	**246**	**242**		
	a	**a**	**a**	**a**		
1999						
Crested	274	218	248	189	**232**	**a**
Native	344	353	381	196	**318**	**b**
Mean	**309**	**286**	**315**	**193**		
	a	**a**	**a**	**b**		
2000						
Crested	323	290	305	280	**299**	**a**
Native	286	286	306	289	**292**	**a**
Mean	**305**	**288**	**305**	**284**		
	a	**a**	**a**	**a**		

*Insufficient data available to perform two-way ANOVA.

Table 5 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1997					
Cap	3	21734	7244	3.299	**0.048**
Vegetation	1	711.8	711.8	0.324	0.577
Cap x Vegetation	3	10189	3396	1.546	0.241
1998					
Cap	3	4276	1425	2.223	0.125
Vegetation	1	3210	3210	5.008	**0.040**
Cap x Vegetation	3	3912	1304	2.034	0.150
1999					
Cap	3	57587	19195	30.732	**<0.001**
Vegetation	1	44611	44611	71.421	**<0.001**
Cap x Vegetation	3	16705	5568	8.915	**0.001**
2000					
Cap	3	2141	713.8	2.351	0.111
Vegetation	1	354.6	354.6	1.168	0.296
Cap x Vegetation	3	1844	614.7	2.025	0.151

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Table 6. Mean estimates of volumetric soil water content (%) at the lower limit of extraction by plants for crested-wheatgrass and native vegetation under three irrigation treatments in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. For the analyses, data for different cap-types were pooled. P values show results of one-way ANOVA's; means underscored by different letters are significantly different at P = 0.05 based on Tukey's multiple comparison test. Significant P values are in bold typeface.

	Crested Wheatgrass				Native Vegetation				
	Ambient	**Summer**	**Fall/Spring**	**P Value**		**Ambient**	**Summer**	**Fall/Spring**	**P Value**
1995	13.8	14.5	22.4	**<0.001**	**1995**	13.9	13.8	22.4	**<0.001**
	a	a	b			a	a	b	
1996	14.7	18.3	18.4	**0.008**	**1996**	15.1	16.7	19.6	**0.009**
	a	b	b			a	ab	b	
1997	15.3	19.0	17.9	**<0.001**	**1997**	15.5	16.1	15.7	0.41
	a	b	b			a	a	a	
1998	15.5	19.4	18.4	**<0.001**	**1998**	15.4	16.2	15.5	0.27
	a	b	b			a	a	a	
1999	16.9	18.6	20.9	**0.007**	**1999**	15.1	15.5	15.9	0.52
	a	ab	b			a	a	a	
2000	15.5	17.8	18.4	**0.006**	**2000**	15.0	15.8	14.9	0.14
	a	b	b			a	a	a	

Table 7. Mean end-of-season soil moisture content (%) in the top 0.5 m of the soil profile for soil-only and shallow-biobarrier caps under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	12.0	9.5	**10.7**	**a**
Native	11.9	9.2	**10.5**	**a**
Mean	**11.9**	**9.3**		
	a	**b**		
1996				
Crested	12.8	9.8	**11.3**	**a**
Native	12.1	10.2	**11.1**	**a**
Mean	**12.4**	**10.0**		
	a	**b**		
1997				
Crested	14.2	11.0	**12.6**	**a**
Native	13.6	11.5	**12.5**	**a**
Mean	**13.9**	**11.2**		
	a	**b**		
1998				
Crested	14.2	10.4	**12.3**	**a**
Native	13.4	10.7	**12.1**	**a**
Mean	**13.8**	**10.5**		
	a	**b**		
1999				
Crested	14.6	9.8	**12.2**	**a**
Native	13.6	9.7	**11.6**	**a**
Mean	**14.1**	**9.7**		
	a	**b**		
2000				
Crested	13.9	9.8	**11.9**	**a**
Native	13.1	9.9	**11.5**	**a**
Mean	**13.5**	**9.9**		
	a	**b**		

Table 7 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	20.44	20.44	13.017	**0.007**
Vegetation	1	0.137	0.137	0.087	0.776
Cap x Vegetation	1	0.0243	0.0243	0.016	0.904
1996					
Cap	1	17.91	17.91	5.522	**0.047**
Vegetation	1	0.0901	0.0901	0.028	0.872
Cap x Vegetation	1	1.056	1.056	0.326	0.584
1997					
Cap	1	21.17	21.17	5.565	**0.046**
Vegetation	1	0.00213	0.00213	0.001	0.982
Cap x Vegetation	1	0.832	0.832	0.219	0.653
1998					
Cap	1	31.66	31.66	7.282	**0.027**
Vegetation	1	0.156	0.156	0.036	0.854
Cap x Vegetation	1	0.913	0.913	0.210	0.659
1999					
Cap	1	56.72	56.72	25.451	**<0.001**
Vegetation	1	0.891	0.891	0.400	0.545
Cap x Vegetation	1	0.612	0.612	0.275	0.614
2000					
Cap	1	39.24	39.24	11.922	**0.009**
Vegetation	1	0.480	0.480	0.146	0.712
Cap x Vegetation	1	0.563	0.563	0.171	0.690

Table 7 (continued).

B. Summer Irrigation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	11.8	9.3	**10.5**	**a**
Native	10.3	9.1	**9.7**	**a**
Mean	**11.1**	**9.2**		
	a	**a**		
1996				
Crested	17.4	12.6	**15.0**	**a**
Native	14.2	12.5	**13.4**	**a**
Mean	**15.8**	**12.5**		
	a	**b**		
1997				
Crested	17.4	14.0	**15.7**	**a**
Native	14.6	12.6	**13.6**	**a**
Mean	**16.0**	**13.3**		
	a	**a**		
1998				
Crested	18.1	14.5	**16.3**	**a**
Native	15.1	12.7	**13.9**	**a**
Mean	**16.6**	**13.6**		
	a	**b**		
1999				
Crested	17.7	12.9	**15.3**	**a**
Native	14.6	12.1	**13.4**	**a**
Mean	**16.1**	**12.5**		
	a	**b**		
2000				
Crested	16.8	11.9	**14.3**	**a**
Native	14.5	12.0	**13.2**	**a**
Mean	**15.6**	**11.9**		
	a	**b**		

Table 7 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	10.25	10.25	3.924	0.083
Vegetation	1	2.009	2.009	0.769	0.406
Cap x Vegetation	1	1.235	1.235	0.473	0.511
1996					
Cap	1	32.41	32.41	9.025	**0.017**
Vegetation	1	7.938	7.938	2.211	0.175
Cap x Vegetation	1	7.146	7.146	1.990	0.196
1997					
Cap	1	22.22	22.22	4.924	0.057
Vegetation	1	12.51	12.51	2.771	0.135
Cap x Vegetation	1	1.577	1.577	0.349	0.571
1998					
Cap	1	27.51	27.51	5.747	**0.043**
Vegetation	1	17.16	17.16	3.584	0.095
Cap x Vegetation	1	0.946	0.946	0.198	0.668
1999					
Cap	1	39.90	39.90	5.458	**0.048**
Vegetation	1	10.94	10.94	1.497	0.256
Cap x Vegetation	1	3.831	3.831	0.524	0.490
2000					
Cap	1	40.78	40.78	7.267	**0.027**
Vegetation	1	3.521	3.521	0.628	0.451
Cap x Vegetation	1	4.368	4.368	0.779	0.403

Table 7 (continued)

C. Fall/Spring Irrigation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	18.4	15.9	**17.2**	**a**
Native	19.9	16.9	**18.4**	**a**
Mean	**19.2**	**16.4**		
	a	**b**		
1996				
Crested	12.9	11.0	**11.9**	**a**
Native	17.8	15.6	**16.7**	**a**
Mean	**15.3**	**13.3**		
	a	**a**		
1997				
Crested	13.4	11.7	**12.6**	**a**
Native	14.3	11.9	**13.1**	**a**
Mean	**13.9**	**11.8**		
	a	**b**		
1998				
Crested	14.4	11.4	**12.9**	**a**
Native	13.7	12.4	**13.0**	**a**
Mean	**14.0**	**11.9**		
	a	**b**		
1999				
Crested	15.9	10.9	**13.4**	**a**
Native	13.2	10.4	**11.8**	**a**
Mean	**14.6**	**10.6**		
	a	**b**		
2000				
Crested	14.3	10.0	**12.1**	**a**
Native	13.1	10.5	**11.8**	**a**
Mean	**13.7**	**10.2**		
	a	**b**		

Table 7 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	23.97	23.97	6.778	**0.031**
Vegetation	1	4.613	4.613	1.304	0.286
Cap x Vegetation	1	0.198	0.198	0.056	0.819
1996					
Cap	1	12.44	12.44	0.618	0.455
Vegetation	1	67.02	67.02	3.327	0.106
Cap x Vegetation	1	0.0533	0.0533	0.003	0.960
1997					
Cap	1	13.06	13.06	5.612	**0.045**
Vegetation	1	0.897	0.897	0.385	0.552
Cap x Vegetation	1	0.449	0.449	0.193	0.672
1998					
Cap	1	14.04	14.04	5.803	**0.043**
Vegetation	1	0.0432	0.0432	0.018	0.897
Cap x Vegetation	1	2.202	2.202	0.910	0.368
1999					
Cap	1	46.37	46.37	9.548	**0.015**
Vegetation	1	7.254	7.254	1.494	0.256
Cap x Vegetation	1	3.707	3.707	0.763	0.408
2000					
Cap	1	34.88	34.88	13.648	**0.006**
Vegetation	1	0.354	0.354	0.138	0.720
Cap x Vegetation	1	2.202	2.202	0.861	0.381

Table 8. Mean end-of-season soil moisture content (%) in the bottom 1.5 m of the soil profile for soil-only and shallow-biobarrier caps under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	15.2	16.9	**16.0**	**a**
Native	15.2	15.0	**15.1**	**a**
Mean	**15.2**	**15.9**		
	a	**a**		
1996				
Crested	16.0	17.3	**16.6**	**a**
Native	16.6	16.6	**16.6**	**a**
Mean	**16.3**	**16.9**		
	a	**a**		
1997				
Crested	16.0	17.3	**16.7**	**a**
Native	16.2	16.5	**16.4**	**a**
Mean	**16.1**	**16.9**		
	a	**a**		
1998				
Crested	16.1	17.1	**16.6**	**a**
Native	16.6	16.4	**16.5**	**a**
Mean	**16.4**	**16.7**		
	a	**a**		
1999				
Crested	19.5	17.5	**18.5**	**a**
Native	17.2	16.0	**16.6**	**a**
Mean	**18.4**	**16.8**		
	a	**a**		
2000				
Crested	17.8	17.1	**17.4**	**a**
Native	16.1	16.2	**16.2**	**a**
Mean	**17.0**	**16.6**		
	a	**a**		

Table 8 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	1.740	1.740	0.975	0.352
Vegetation	1	2.439	2.439	1.367	0.276
Cap x Vegetation	1	2.679	2.679	1.501	0.255
1996					
Cap	1	1.261	1.261	0.398	0.546
Vegetation	1	0.00368	0.00368	0.001	0.974
Cap x Vegetation	1	1.340	1.340	0.423	0.534
1997					
Cap	1	1.794	1.794	0.408	0.541
Vegetation	1	0.213	0.213	0.049	0.831
Cap x Vegetation	1	0.635	0.635	0.144	0.714
1998					
Cap	1	0.433	0.433	0.142	0.716
Vegetation	1	0.0616	0.0616	0.020	0.890
Cap x Vegetation	1	1.153	1.153	0.379	0.555
1999					
Cap	1	7.442	7.442	1.263	0.249
Vegetation	1	11.04	11.04	1.873	0.208
Cap x Vegetation	1	0.468	0.468	0.079	0.785
2000					
Cap	1	0.323	0.323	0.114	0.745
Vegetation	1	4.928	4.928	1.735	0.0224
Cap x Vegetation	1	0.414	0.414	0.146	0.712

Table 8 (continued).

B. Summer Irrigation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	14.4	18.8	**16.6**	**a**
Native	14.5	15.4	**14.9**	**a**
Mean	**14.5**	**17.1**		
	a	**b**		
1996				
Crested	18.0	17.9	**18.0**	**a**
Native	16.7	17.9	**17.3**	**a**
Mean	**17.4**	**17.9**		
	a	**a**		
1997				
Crested	17.9	18.9	**18.4**	**a**
Native	16.6	17.3	**16.9**	**b**
Mean	**17.3**	**18.1**		
	a	**a**		
1998				
Crested	18.3	19.0	**18.7**	**a**
Native	16.6	17.2	**16.9**	**b**
Mean	**17.5**	**18.1**		
	a	**a**		
1999				
Crested	18.2	18.5	**18.4**	**a**
Native	16.2	17.5	**16.8**	**a**
Mean	**17.2**	**18.0**		
	a	**a**		
2000				
Crested	17.5	18.7	**18.1**	**a**
Native	15.9	17.1	**16.5**	**a**
Mean	**16.7**	**17.9**		
	a	**a**		

Table 8 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	21.36	21.36	6.383	**0.035**
Vegetation	1	8.551	8.551	2.555	0.149
Cap x Vegetation	1	9.100	9.100	2.719	0.138
1996					
Cap	1	0.837	0.837	0.431	0.530
Vegetation	1	1.147	1.147	0.590	0.464
Cap x Vegetation	1	1.380	1.380	0.710	0.424
1997					
Cap	1	1.960	1.930	1.949	0.200
Vegetation	1	6.586	6.586	6.548	**0.034**
Cap x Vegetation	1	0.0520	0.0520	0.052	0.826
1998					
Cap	1	1.374	1.374	0.785	0.402
Vegetation	1	9.612	9.612	5.491	**0.047**
Cap x Vegetation	1	0.00270	0.00270	0.002	0.970
1999					
Cap	1	2.134	2.134	0.858	0.381
Vegetation	1	6.992	6.992	2.812	0.132
Cap x Vegetation	1	0.791	0.791	0.318	0.588
2000					
Cap	1	4.236	4.236	2.136	0.182
Vegetation	1	8.184	8.184	4.126	0.077
Cap x Vegetation	1	0.005	0.005	0.003	0.960

Table 8 (continued).

C. Fall/Spring Irrigation

	Soil Only	Shallow Biobarrier	**Mean**	
1995				
Crested	24.6	24.5	**24.6**	**a**
Native	23.9	24.7	**24.3**	**a**
Mean	**24.3**	**24.6**		
	a	**a**		
1996				
Crested	16.8	24.0	**20.4**	**a**
Native	21.7	21.5	**21.6**	**a**
Mean	**19.2**	**22.7**		
	a	**a**		
1997				
Crested	16.7	23.8	**20.3**	**a**
Native	16.8	17.6	**17.2**	**b**
Mean	**16.7**	**20.7**		
	a	**b**		
1998				
Crested	19.5	23.7	**21.6**	**a**
Native	16.4	17.6	**17.0**	**b**
Mean	**18.0**	**20.7**		
	a	**b**		
1999				
Crested	23.5	27.9	**25.7**	**a**
Native	16.5	17.4	**17.0**	**b**
Mean	**20.0**	**22.6**		
	a	**b**		
2000				
Crested	19.0	26.4	**22.7**	**a**
Native	15.8	17.0	**16.4**	**b**
Mean	**17.4**	**21.7**		
	a	**b**		

Table 8 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	0.392	0.392	0.126	0.732
Vegetation	1	0.190	0.190	0.061	0.811
Cap x Vegetation	1	0.816	0.816	0.262	0.622
1996					
Cap	1	37.14	37.14	1.392	0.272
Vegetation	1	4.189	4.189	0.157	0.702
Cap x Vegetation	1	42.08	42.08	1.577	0.245
1997					
Cap	1	47.68	47.68	16.932	**0.003**
Vegetation	1	28.34	28.34	10.063	**0.013**
Cap x Vegetation	1	30.08	30.08	10.683	**0.011**
1998					
Cap	1	22.03	22.03	5.551	**0.046**
Vegetation	1	62.75	62.75	15.808	**0.004**
Cap x Vegetation	1	6.840	6.840	1.723	0.226
1999					
Cap	1	20.88	20.88	14.797	**0.005**
Vegetation	1	227.0	227.0	160.833	**<0.001**
Cap x Vegetation	1	9.346	9.346	6.622	**0.033**
2000					
Cap	1	55.26	55.26	26.875	**<0.001**
Vegetation	1	116.8	116.8	56.784	**<0.001**
Cap x Vegetation	1	28.99	28.99	14.098	**0.006**

Table 9. Mean end-of-season soil moisture content (%) in the top 1 m of the soil profile for soil-only, deep-biobarrier, and RCRA caps under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Deep Biobarrier	RCRA	**Mean**	
1995					
Crested	13.1	11.0	12.5	**12.2**	**a**
Native	12.9	11.7	13.8	**12.8**	**a**
Mean	**13.0**	**11.3**	**13.1**		
	a	**b**	**a**		
1996					
Crested	13.9	11.5	13.6	**13.0**	**a**
Native	13.7	12.6	14.7	**13.6**	**a**
Mean	**13.8**	**12.0**	**14.2**		
	ab	**a**	**b**		
1997					
Crested	14.7	12.9	15.0	**14.2**	**a**
Native	14.5	13.3	15.8	**14.5**	**a**
Mean	**14.6**	**13.1**	**15.4**		
	ab	**a**	**b**		
1998					
Crested	14.8	13.9	14.8	**14.5**	**a**
Native	14.3	13.2	15.6	**14.4**	**a**
Mean	**14.5**	**13.5**	**15.2**		
	a	**a**	**a**		
1999					
Crested	16.5	14.1	16.3	**15.6**	**a**
Native	14.9	14.0	14.4	**14.4**	**a**
Mean	**15.7**	**14.0**	**15.4**		
	a	**a**	**a**		
2000					
Crested	14.9	12.5	14.2	**13.9**	**a**
Native	14.0	12.8	15.1	**13.9**	**a**
Mean	**14.5**	**12.6**	**14.6**		
	a	**b**	**a**		

Table 9 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	2	12.11	6.055	6.063	**0.015**
Vegetation	1	1.508	1.508	1.510	0.243
Cap x Vegetation	2	1.774	0.887	0.888	0.437
1996					
Cap	2	15.43	7.713	5.868	**0.017**
Vegetation	1	1.811	1.811	1.378	0.263
Cap x Vegetation	2	1.858	0.929	0.707	0.513
1997					
Cap	2	16.74	8.372	5.237	**0.023**
Vegetation	1	0.423	0.423	0.265	0.616
Cap x Vegetation	2	0.690	0.345	0.216	0.809
1998					
Cap	2	8.767	4.383	1.451	0.273
Vegetation	1	0.0882	0.0882	0.029	0.867
Cap x Vegetation	2	2.073	1.036	0.343	0.716
1999					
Cap	2	9.115	4.557	1.342	0.298
Vegetation	1	6.625	6.625	1.950	0.188
Cap x Vegetation	2	2.658	1.329	0.391	0.685
2000					
Cap	2	14.51	7.256	7.921	**0.006**
Vegetation	1	0.0374	0.0374	0.041	0.843
Cap x Vegetation	2	2.584	1.292	1.140	0.282

Table 9 (continued).

B. Summer Irrigation

	Soil Only	Deep Biobarrier	RCRA	**Mean**	
1995					
Crested	12.6	10.2	15.1	**12.7**	**a**
Native	11.8	11.0	14.3	**12.4**	**a**
Mean	**12.2**	**10.6**	**14.7**		
	ab	**a**	**b**		
1996					
Crested	18.3	17.9	21.5	**19.2**	**a**
Native	15.0	14.7	17.9	**15.9**	**b**
Mean	**16.6**	**16.3**	**19.7**		
	a	**a**	**b**		
1997					
Crested	17.9	19.2	22.4	**19.8**	**a**
Native	15.2	14.3	16.4	**15.3**	**b**
Mean	**16.5**	**16.7**	**19.4**		
	a	**a**	**b**		
1998					
Crested	18.5	20.7	22.2	**20.5**	**a**
Native	15.5	14.5	16.3	**15.4**	**b**
Mean	**17.0**	**17.6**	**19.3**		
	a	**a**	**a**		
1999					
Crested	18.2	19.2	21.1	**19.5**	**a**
Native	14.8	13.3	15.6	**14.6**	**b**
Mean	**16.5**	**16.3**	**18.4**		
	a	**a**	**a**		
2000					
Crested	17.2	17.7	19.2	**18.0**	**a**
Native	14.8	13.4	16.6	**14.9**	**b**
Mean	**16.0**	**15.6**	**17.9**		
	a	**a**	**a**		

Table 9 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	2	51.23	25.61	4.481	**0.035**
Vegetation	1	0.376	0.376	0.066	0.802
Cap x Vegetation	2	2.734	1.367	0.239	0.791
1996					
Cap	2	42.04	21.02	5.472	**0.020**
Vegetation	1	50.37	50.37	13.112	**0.004**
Cap x Vegetation	2	0.0765	0.0383	0.010	0.990
1997					
Cap	2	31.36	15.68	7.437	**0.008**
Vegetation	1	91.67	91.67	43.477	**<0.001**
Cap x Vegetation	2	8.427	4.213	1.998	0.178
1998					
Cap	2	16.75	8.38	2.410	0.132
Vegetation	1	113.8	113.8	32.742	**<0.001**
Cap x Vegetation	2	8.972	4.486	1.291	0.311
1999					
Cap	2	15.54	7.770	0.866	0.446
Vegetation	1	109.0	109.0	12.140	**0.005**
Cap x Vegetation	2	5.391	2.695	0.300	0.746
2000					
Cap	2	18.27	9.133	1.249	0.322
Vegetation	1	43.21	43.21	5.909	**0.032**
Cap x Vegetation	2	3.228	1.614	0.221	0.805

Table 9 (continued).

C. Fall/Spring Irrigation

	Soil Only	Deep Biobarrier	RCRA	**Mean**	
1995					
Crested	21.0	22.3	20.6	**21.3**	**a**
Native	21.2	19.6	22.5	**21.1**	**a**
Mean	**21.1**	**21.0**	**21.6**		
	a	**a**	**a**		
1996					
Crested	14.2	16.5	15.9	**15.5**	**a**
Native	19.0	16.5	18.5	**18.0**	**a**
Mean	**16.6**	**16.5**	**17.2**		
	a	**a**	**a**		
1997					
Crested	14.5	13.2	17.6	**15.1**	**a**
Native	15.1	12.8	15.5	**14.4**	**a**
Mean	**14.8**	**13.0**	**16.6**		
	ab	**a**	**b**		
1998					
Crested	16.1	14.5	17.1	**15.9**	**a**
Native	14.5	12.2	15.4	**14.0**	**a**
Mean	**15.3**	**13.3**	**16.2**		
	a	**a**	**a**		
1999					
Crested	18.2	16.9	16.1	**17.1**	**a**
Native	14.4	12.4	16.9	**14.6**	**b**
Mean	**16.3**	**14.7**	**16.5**		
	a	**a**	**a**		
2000					
Crested	15.5	13.3	15.5	**14.7**	**a**
Native	13.9	12.4	14.5	**13.6**	**a**
Mean	**14.7**	**12.8**	**15.0**		
	a	**a**	**a**		

Table 9 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	2	1.149	0.574	0.211	0.812
Vegetation	1	0.130	0.130	0.048	0.831
Cap x Vegetation	2	16.39	8.195	3.015	0.087
1996					
Cap	2	1.431	0.715	0.021	0.979
Vegetation	1	27.33	27.33	0.805	0.387
Cap x Vegetation	2	17.85	8.923	0.263	0.773
1997					
Cap	2	38.34	19.17	4.625	**0.032**
Vegetation	1	2.020	2.020	0.487	0.498
Cap x Vegetation	2	5.186	2.593	0.626	0.552
1998					
Cap	2	26.08	13.04	3.656	0.058
Vegetation	1	15.89	15.89	4.454	0.056
Cap x Vegetation	2	0.511	0.256	0.072	0.931
1999					
Cap	2	12.23	6.116	1.047	0.381
Vegetation	1	28.08	28.08	4.805	**0.049**
Cap x Vegetation	2	24.68	12.34	2.112	0.164
2000					
Cap	2	16.72	8.358	3.599	0.060
Vegetation	1	6.044	6.044	2.602	0.133
Cap x Vegetation	2	0.392	0.196	0.084	0.920

Table 10. Mean-end-of season soil moisture content (%) in the bottom 1 m of the soil profile for soil-only and deep-biobarrier caps under (A) ambient precipitation, (B) summer irrigation, and (C) fall/spring irrigation. Crested refers to crested-wheatgrass vegetation; native refers to native vegetation. Vegetation means followed by different letters, or cap-type means underscored by different letters, are significantly different at P = 0.05 based on results of Tukey's multiple comparisons tests following two-way ANOVA's. Results of two-way ANOVA's are shown for each irrigation treatment following the table of means. In ANOVA tables, significant P values are in bold typeface.

A. Ambient Precipitation

	Soil Only	Deep Biobarrier	**Mean**	
1995				
Crested	15.7	15.7	**15.7**	**a**
Native	15.9	16.5	**16.2**	**a**
Mean	**15.8**	**16.1**		
	a	**a**		
1996				
Crested	16.5	17.5	**17.0**	**a**
Native	17.3	17.6	**17.4**	**a**
Mean	**16.9**	**17.5**		
	a	**a**		
1997				
Crested	16.5	17.5	**17.0**	**a**
Native	16.7	17.5	**17.1**	**a**
Mean	**16.6**	**17.5**		
	a	**a**		
1998				
Crested	16.5	18.7	**17.6**	**a**
Native	17.4	17.5	**17.4**	**a**
Mean	**16.9**	**18.1**		
	a	**a**		
1999				
Crested	20.2	21.1	**20.7**	**a**
Native	17.7	16.9	**17.3**	**a**
Mean	**19.0**	**19.0**		
	a	**a**		
2000				
Crested	17.2	19.5	**18.3**	**a**
Native	16.8	17.0	**16.9**	**a**
Mean	**17.0**	**18.2**		
	a	**a**		

Table 10 (continued).

Ambient Precipitation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	0.307	0.307	0.165	0.695
Vegetation	1	0.770	0.770	0.413	0.538
Cap x Vegetation	1	0.252	0.252	0.135	0.722
1996					
Cap	1	1.313	1.313	0.557	0.477
Vegetation	1	0.525	0.525	0.223	0.650
Cap x Vegetation	1	0.476	0.476	0.202	0.665
1997					
Cap	1	2.530	2.530	0.585	0.466
Vegetation	1	0.0331	0.0331	0.008	0.932
Cap x Vegetation	1	0.0154	0.0154	0.004	0.954
1998					
Cap	1	4.118	4.118	1.457	0.262
Vegetation	1	0.118	0.118	0.042	0.843
Cap x Vegetation	1	3.070	3.070	1.086	0.328
1999					
Cap	1	0.0147	0.0147	0.001	0.976
Vegetation	1	33.74	33.74	2.252	0.172
Cap x Vegetation	1	2.117	2.117	0.141	0.717
2000					
Cap	1	4.902	4.902	0.486	0.505
Vegetation	1	6.380	6.380	0.633	0.449
Cap x Vegetation	1	3.488	3.488	0.346	0.573

Table 10 (continued).

B. Summer Irrigation

	Soil Only	Deep Biobarrier	**Mean**	
1995				
Crested	14.9	15.0	**15.0**	**a**
Native	15.1	16.0	**15.6**	**a**
Mean	**15.0**	**15.5**		
	a	**a**		
1996				
Crested	17.5	16.8	**17.1**	**a**
Native	17.2	17.6	**17.4**	**a**
Mean	**17.3**	**17.2**		
	a	**a**		
1997				
Crested	17.7	17.4	**17.6**	**a**
Native	17.0	17.4	**17.2**	**a**
Mean	**17.4**	**17.4**		
	a	**a**		
1998				
Crested	18.0	17.6	**17.8**	**a**
Native	17.0	17.8	**17.4**	**a**
Mean	**17.5**	**17.7**		
	a	**a**		
1999				
Crested	17.9	17.3	**17.6**	**a**
Native	16.8	16.0	**16.4**	**a**
Mean	**17.3**	**16.6**		
	a	**a**		
2000				
Crested	17.5	17.7	**17.6**	**a**
Native	16.4	17.4	**16.9**	**a**
Mean	**16.9**	**17.5**		
	a	**a**		

Table 10 (continued).

Summer Irrigation, Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	0.677	0.677	0.570	0.472
Vegetation	1	1.074	1.074	0.905	0.369
Cap x Vegetation	1	0.460	0.460	0.388	0.551
1996					
Cap	1	0.0444	0.0444	0.029	0.869
Vegetation	1	0.185	0.185	0.120	0.738
Cap x Vegetation	1	0.735	0.735	0.477	0.509
1997					
Cap	1	0.00120	0.00120	0.001	0.976
Vegetation	1	0.368	0.368	0.289	0.605
Cap x Vegetation	1	0.367	0.367	0.289	0.605
1998					
Cap	1	0.0936	0.0936	0.054	0.822
Vegetation	1	0.546	0.546	0.314	0.591
Cap x Vegetation	1	1.129	1.129	0.649	0.444
1999					
Cap	1	1.498	1.498	0.765	0.407
Vegetation	1	4.465	4.465	2.279	0.170
Cap x Vegetation	1	0.0243	0.0243	0.012	0.914
2000					
Cap	1	1.086	1.086	0.648	0.444
Vegetation	1	1.562	1.562	0.932	0.363
Cap x Vegetation	1	0.460	0.460	0.275	0.615

Table 10 (continued).

C. **Fall/Spring Irrigation**

	Soil Only	Deep Biobarrier	**Mean**	
1995				
Crested	25.2	25.4	**25.3**	**a**
Native	24.6	23.3	**24.0**	**a**
Mean	**24.9**	**24.3**		
	a	**a**		
1996				
Crested	17.4	25.9	**21.7**	**a**
Native	22.4	21.7	**22.1**	**a**
Mean	**19.9**	**23.8**		
	a	**a**		
1997				
Crested	17.2	21.3	**19.3**	**a**
Native	17.3	17.2	**17.3**	**b**
Mean	**17.3**	**19.2**		
	a	**b**		
1998				
Crested	20.4	20.9	**20.6**	**a**
Native	17.0	16.9	**17.0**	**b**
Mean	**18.7**	**18.9**		
	a	**a**		
1999				
Crested	25.1	27.3	**26.2**	**a**
Native	17.1	18.0	**17.5**	**b**
Mean	**21.1**	**22.6**		
	a	**a**		
2000				
Crested	20.2	22.6	**21.4**	**a**
Native	16.4	17.0	**16.7**	**b**
Mean	**18.3**	**19.8**		
	a	**a**		

Table 10 (continued).

Fall/Spring Irrigation, Two-Way ANOVA Results

Source of Variation	DF	SS	MS	F	P
1995					
Cap	1	1.033	1.033	0.064	0.807
Vegetation	1	5.307	5.307	0.326	0.584
Cap x Vegetation	1	1.703	1.703	0.105	0.755
1996					
Cap	1	46.34	46.34	1.453	0.262
Vegetation	1	0.418	0.418	0.013	0.912
Cap x Vegetation	1	62.93	62.93	1.973	0.198
1997					
Cap	1	11.64	11.64	6.034	**0.040**
Vegetation	1	11.80	11.80	6.116	**0.039**
Cap x Vegetation	1	13.31	13.31	6.901	**0.030**
1998					
Cap	1	0.105	0.105	0.025	0.879
Vegetation	1	39.97	39.97	9.417	**0.015**
Cap x Vegetation	1	0.307	0.307	0.072	0.795
1999					
Cap	1	7.254	7.254	4.620	0.064
Vegetation	1	223.9	223.9	142.563	**<0.001**
Cap x Vegetation	1	1.435	1.435	0.914	0.367
2000					
Cap	1	6.946	6.946	1.788	0.218
Vegetation	1	66.22	66.22	17.047	**0.003**
Cap x Vegetation	1	2.755	2.755	0.709	0.424

Table 11. A. Average depth of water (mm) applied before drainage was observed or inferred for soil-only, shallow-biobarrier, or deep-biobarrier subplots in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory (see section 3.8 for details). Crested refers to crested-wheatgrass vegetation; native refers to native vegetation.

	Soil Only	Shallow Biobarrier	Deep Biobarrier	**Mean**	
Crested	607	727	717	**684**	**a**
Native	705	726	718	**717**	**a**
Mean	**656**	**727**	**718**		
	a	**a**	**a**		

Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
Cap	2	17742	8871	2.616	0.114
Vegetation	1	4862	4862	1.434	0.254
Cap x Vegetation	2	9609	4804	1.417	0.280

B. Amount of water in the entire soil profile when drainage was observed or inferred for soil-only, shallow-biobarrier, or deep-biobarrier subplots in the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory (see section 3.8 details). Crested refers to crested-wheatgrass vegetation; native refers to native vegetation.

	Soil Only	Shallow Biobarrier	Deep Biobarrier	**Mean**	
Crested	579	611	623	**604**	**a**
Native	621	599	608	**610**	**a**
Mean	**600**	**605**	**616**		
	a	**a**	**a**		

Two-way ANOVA Results

Source of Variation	DF	SS	MS	F	P
Cap	2	751.6	375.8	0.460	0.642
Vegetation	1	134.0	134.0	0.164	0.692
Cap x Vegetation	2	3006	1503	1.842	0.201

Table 12. Mean end-of-season soil moisture content (%) before and after the irrigation to failure trials in the spring of 1999 on the four cap configurations and two vegetation types of the Protective Cap/Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. Means underscored by different letters are significantly different at P = 0.05 by Tukey's multiple comparison tests following one-way ANOVA's. Significant P values are shown in bold typeface.

	1998	1999	2000	P Value
Crested Wheatgrass				
Soil Only	18.2	20.3	17.8	0.24
	a	a	a	
Shallow Biobarrier	20.6	22.5	22.3	0.27
	a	a	a	
Deep Biobarrier	17.7	21.1	18.0	**0.03**
	a	b	a	
RCRA	17.1	16.4	15.5	0.22
	a	a	a	
Native Vegetation				
Soil Only	15.7	15.9	15.1	**0.05**
	ab	a	b	
Shallow Biobarrier	16.3	16.0	15.4	0.40
	a	a	a	
Deep Biobarrier	14.9	15.2	14.7	0.10
	a	a	a	
RCRA	15.4	13.6	14.5	**0.04**
	a	b	ab	

Table 13. Results of two-way ANOVA's of vegetative cover in 2000 under three precipitation/irrigation regimes with cap type and vegetation type as factors. Means are shown in Figure 38. Significant P values are shown in bold typeface.

Source of Variation	DF	SS	MS	F	P
Ambient Precipitation					
Cap	3	65.085	21.695	0.555	0.652
Vegetation	1	608.617	608.617	15.581	**0.001**
Cap x Vegetation	3	28.048	9.349	0.239	0.868
Summer Irrigation					
Cap	3	166.969	55.656	1.884	0.173
Vegetation	1	2092.914	2092.914	70.854	**<0.001**
Cap x Vegetation	3	54.685	18.228	0.617	0.614
Fall/Spring Irrigation					
Cap	3	551.153	183.718	3.945	**0.028**
Vegetation	1	3749.684	3749.684	80.510	**<0.001**
Cap x Vegetation	3	149.353	49.784	1.069	0.390

Table 14. Mean end-of-season soil moisture content in 1998 for four cap types planted in two vegetation types under three precipitation regimes. Although results were not always statistically significant due to small sample sizes, crested-wheatgrass subplots always had higher mean values than did native subplots under augmented irrigation regimes. Results from 1998 are typical of results from 1996-2000. Significant P values are shown in bold typeface.

	Crested Wheatgrass	Native Species	Difference	P Value
Ambient Precipitation				
Soil Only Cap	15.597	15.783	-0.187	0.914
Shallow Biobarrier Cap	15.430	14.940	0.490	0.707
Deep Biobarrier Cap	16.307	15.343	0.963	0.484
RCRA Cap	14.830	15.643	-0.813	0.173
Summer Irrigation				
Soil Only Cap	18.277	16.203	2.073	0.210
Shallow Biobarrier Cap	17.913	16.090	1.823	0.083
Deep Biobarrier Cap	19.150	16.173	2.977	**0.014**
RCRA Cap	22.217	16.310	5.907	**0.020**
Fall/Spring Irrigation				
Soil Only Cap	18.197	15.693	2.503	0.183
Shallow Biobarrier Cap	20.620	16.303	4.317	**0.024**
Deep Biobarrier Cap	17.687	14.533	3.153	**0.039**
RCRA Cap	17.073	15.367	1.707	0.396

Table 15. Lithium content for nine species on the shallow- and deep-biobarrier plots in the Protective Cap Biobarrier Experiment at the Idaho National Engineering and Environmental Laboratory. PVC tubes extended below the biobarrier on each shallow- and deep-biobarrier plot (> 1m for shallow biobarriers, >1.5m for deep biobarriers). Lithium chloride was introduced into the soil below the biobarriers through the tubes in June of 2000. Plant tissue samples were collected from plants adjacent to the tubes (within 1m) and from the same species on the opposite side of the subplot (> 5m from the tube) in August of 2000.

Species	Plot	Subplot	Adjacent	Opposite
Shallow Biobarrier			Lithium (mg/kg)	
Agropyron desertorum	2	3	0.80	1.7
Agropyron desertorum	8	2	97	1.6
Agropyron desertorum	8	4	16	0.43
Agropyron desertorum	8	5	4.6	0.30
Agropyron desertorum	8	6	0.39	0.21
Agropyron desertorum	10	1	1.9	0.12
Agropyron desertorum	10	2	1.6	0.12
Artemisia tridentata	2	3	0.51	0.16
Artemisia tridentata	2.	6	0.46	0.17
Artemisia tridentata	8	6	2.7	0.15
Artemisia tridentata	10	2	0.20	0.18
Chrysothamnus nauseosus	2	3	17	0.23
Chrysothamnus nauseosus	8	6	1.7	0.098
Chrysothamnus nauseosus	10	2	3.2	0.12
Elymus lanceolatus	2	6	12	0.30
Krascheninnikovia lanata	2	6	0.14	0.077
Leymus cinerus	2	3	9.1	0.072
Linum perenne	2	6	11	2.2
Deep Biobarrier				
Agropyron desertorum	4	3	0.26	0.17
Agropyron desertorum	4	6	8.6	0.33
Agropyron desertorum	6	5	0.51	0.19
Agropyron desertorum	9	1	1.8	0.27
Artemisia tridentata	4	3	0.36	0.16
Artemisia tridentata	4	6	0.66	0.15
Artemisia tridentata	9	1	0.29	0.14
Chrysothamnus nauseosus	6	5	18	0.17
Chrysothamnus nauseosus	9	1	0.17	0.21
Chrysothamnus viscidiflorus	4	6	8.3	0.46
Chrysothamnus viscidiflorus	9	1	2.1	0.33
Hedysarum boreale	6	5	15	0.35

Table 16. Plant species recommended for planting on evapotranspiration caps at the Idaho National Engineering and Environmental Laboratory. Commercially available cultivars (CV) are listed under source[1]. CS refers to nursery-grown container stock; W refers to transplanting of locally grown materials (wildings; see Shumar and Anderson 1987).

Growth Form &Common Name	Scientific Name	Source
Shrubs:		
Big sagebrush	*Artemisia tridentata*	Local seed, CS, W
Fringed sagebrush	*Artemisia frigida*	Local or commercial seed, W
Green rabbitbrush	*Chrysothamnus viscidiflorus*	Local seed, CS, W
Winterfat	*Krascheninnikovia lanata*	CV: Hatch; Local seed, W
Perennial grasses		
Streambank wheatgrass	*Elymus lanceolatus*	CV: Sodar
Thick-spiked wheatgrass	*Elymus lanceolatus*	CV: Bannock
Bluebunch wheatgrass	*Pseudoroegneria spicata*	CV: Goldar, Secar, Whitmar[1]
Western wheatgrass	*Pascopyrum smithii*	CV: Rosana
Great basin wildrye	*Leymus cinereus*	CV: Magnar, Trailhead
Beardless wildrye	*Leymus triticoides*	CV: Shoshone
Perennial forbs		
Northern sweetvetch	*Hedysarum boreale*	Local or commercial seed
Tapertip hawksbeard	*Crepis acuminata*	Local seed
Lupine	*Lupinus argenteus*	Local seed
Scarlet globe-mallow	*Sphaeralcea munroana*	Local or commercial seed

[1]Additional information on cultivars can be found on the USDA web site: http://plants.usda.gov/

[2]New cultivars of winterfat and of bluebunch wheatgrass are being developed by the Plant Materials Center at Aberdeen, Idaho.