

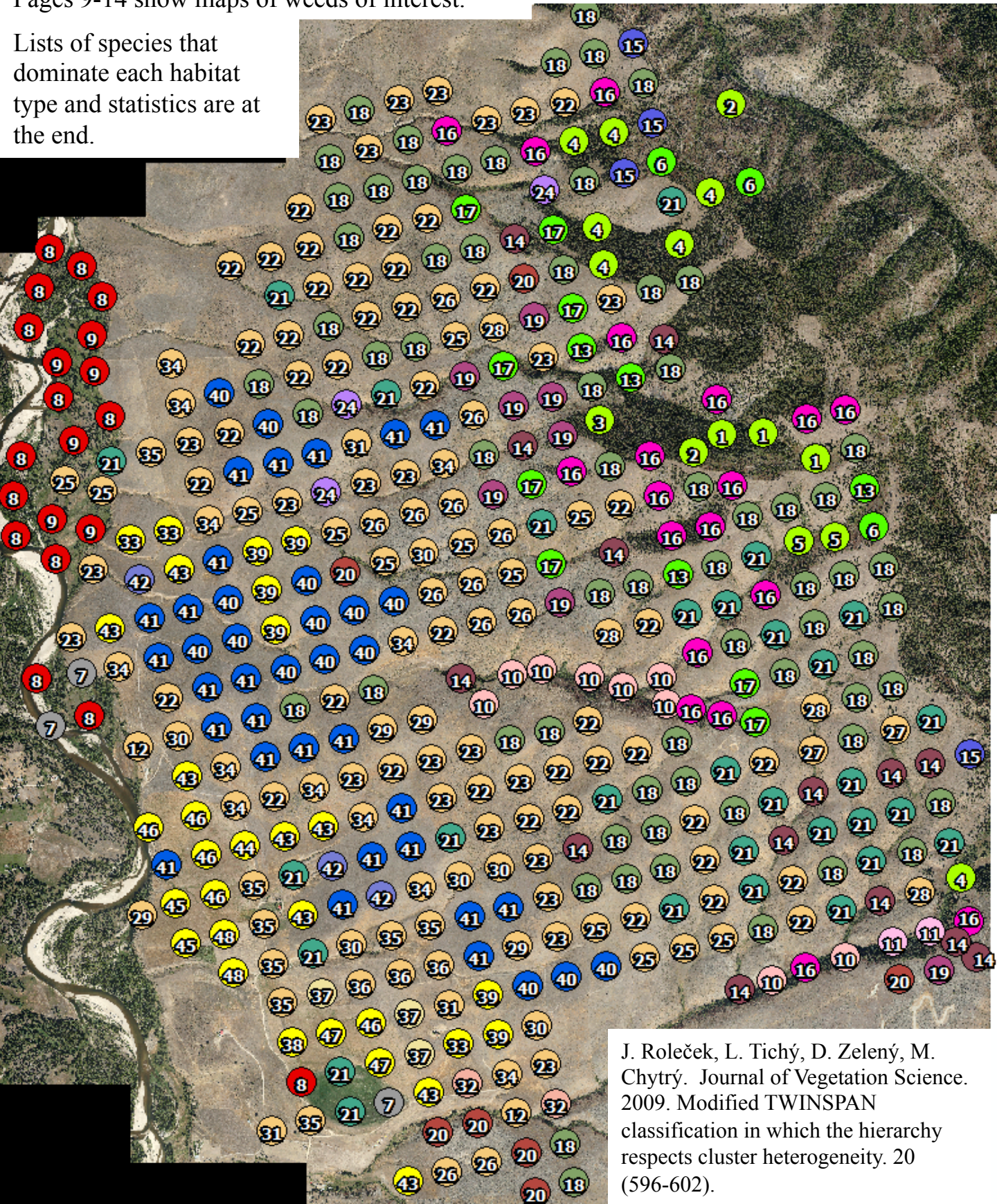
MPG Ranch Vegetation Data Classification and Analysis Overview

Dan Mummey



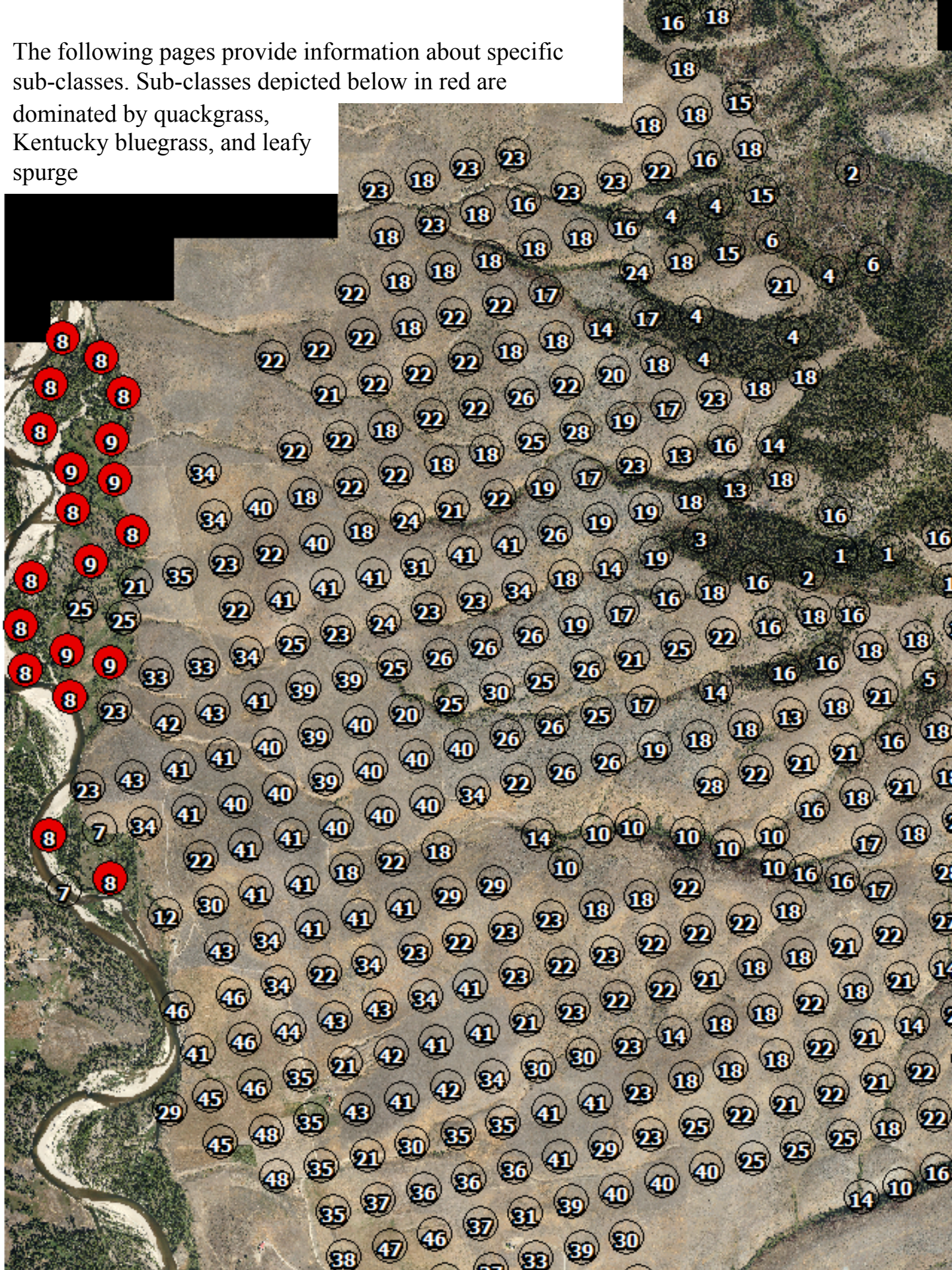
We used the TWINSpan (Two-Way Indicator Species ANalysis) algorithm (Roleček et al., 2009) to classify vegetation. The numbers below refer to the vegetation class, colors indicate the classes dominated by the same species. Pages 3-8 show maps of dominant species class. Pages 9-14 show maps of weeds of interest.

Lists of species that dominate each habitat type and statistics are at the end.

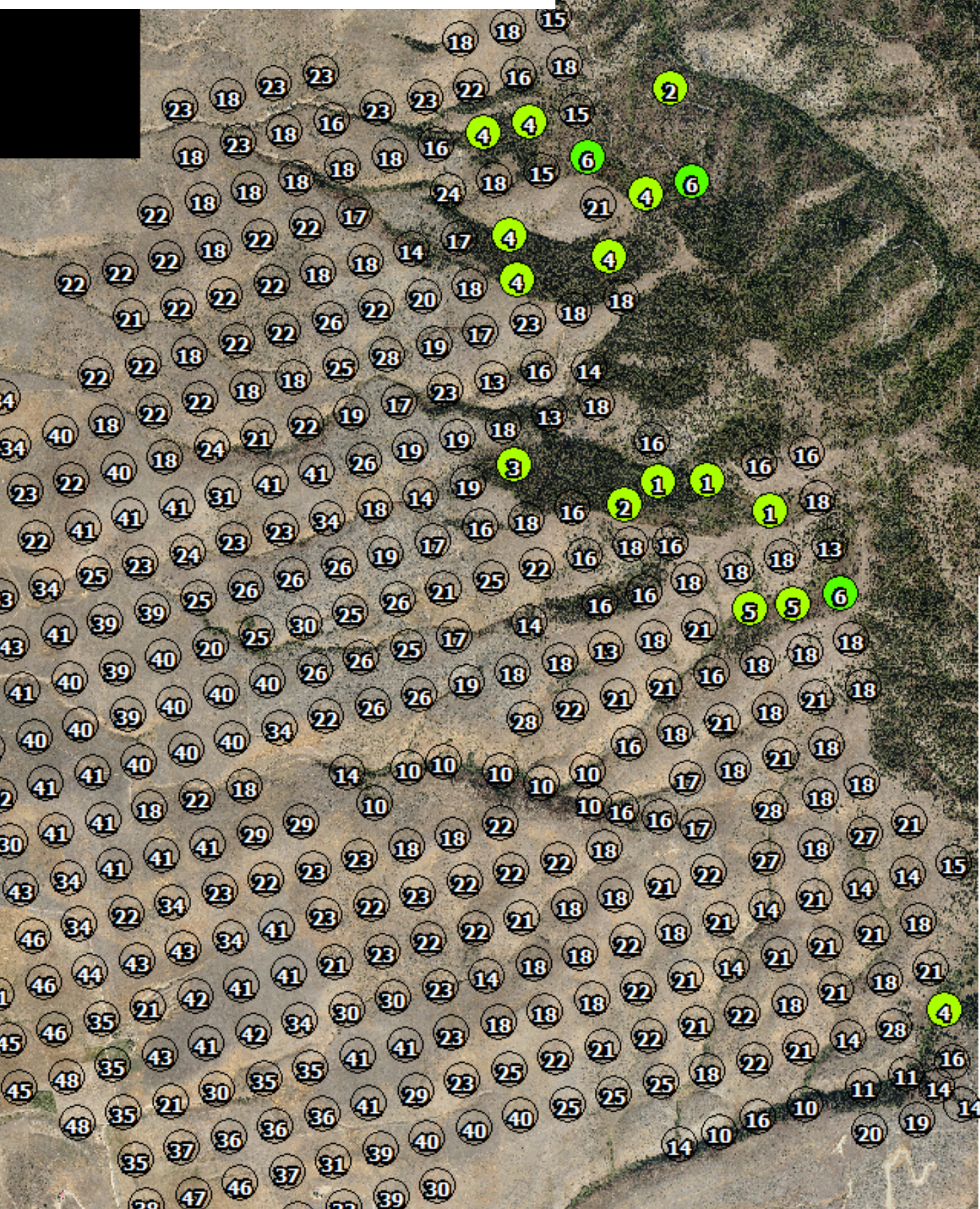


J. Roleček, L. Tichý, D. Zelený, M. Chytrý. Journal of Vegetation Science. 2009. Modified TWINSpan classification in which the hierarchy respects cluster heterogeneity. 20 (596-602).

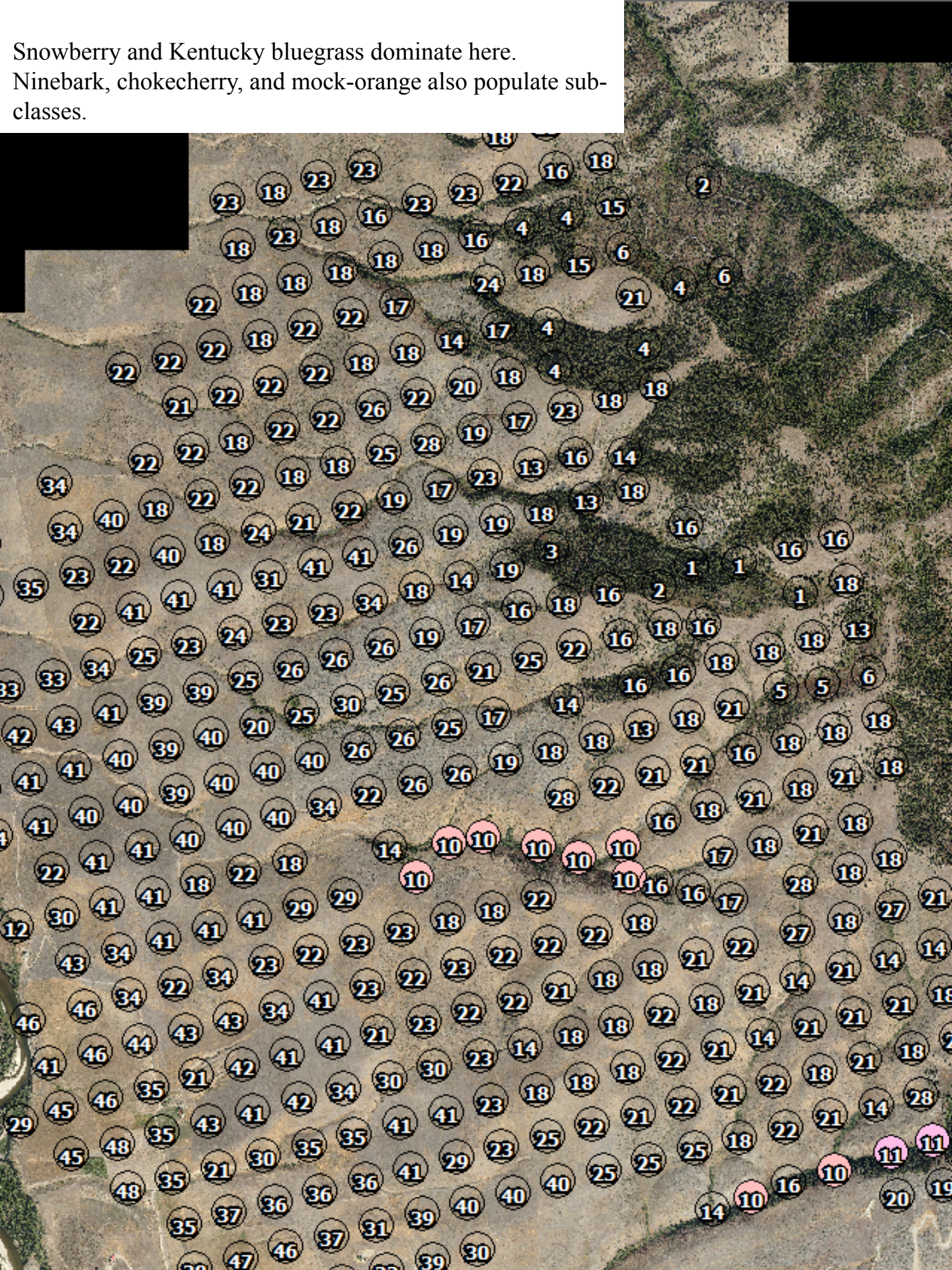
The following pages provide information about specific sub-classes. Sub-classes depicted below in red are dominated by quackgrass, Kentucky bluegrass, and leafy spurge



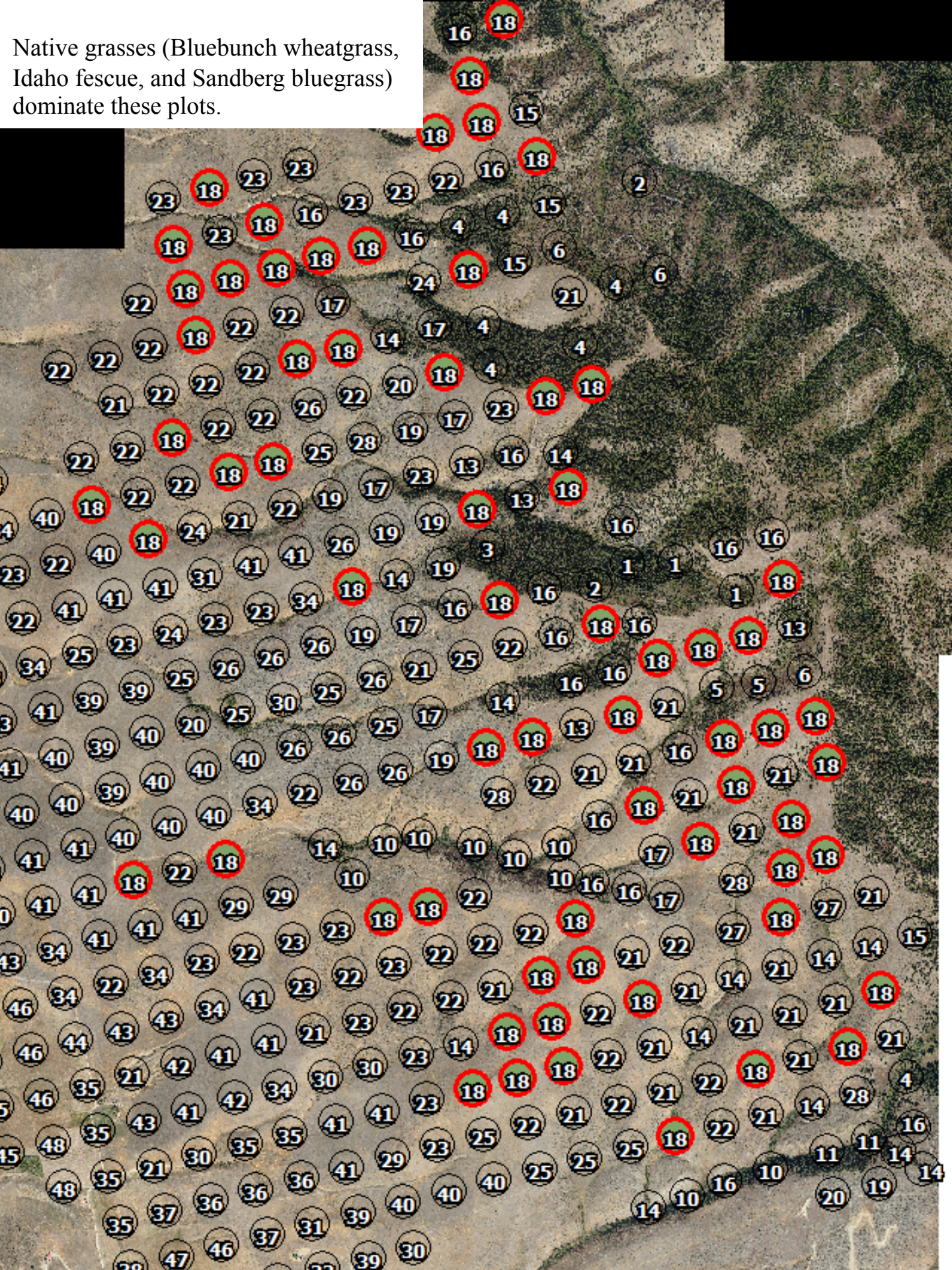
Ninebark dominates these plots. Pinegrass, snowberry, blue wildrye, pine sedge, occur in most sub-classes.



Snowberry and Kentucky bluegrass dominate here.
Ninebark, chokecherry, and mock-orange also populate sub-classes.



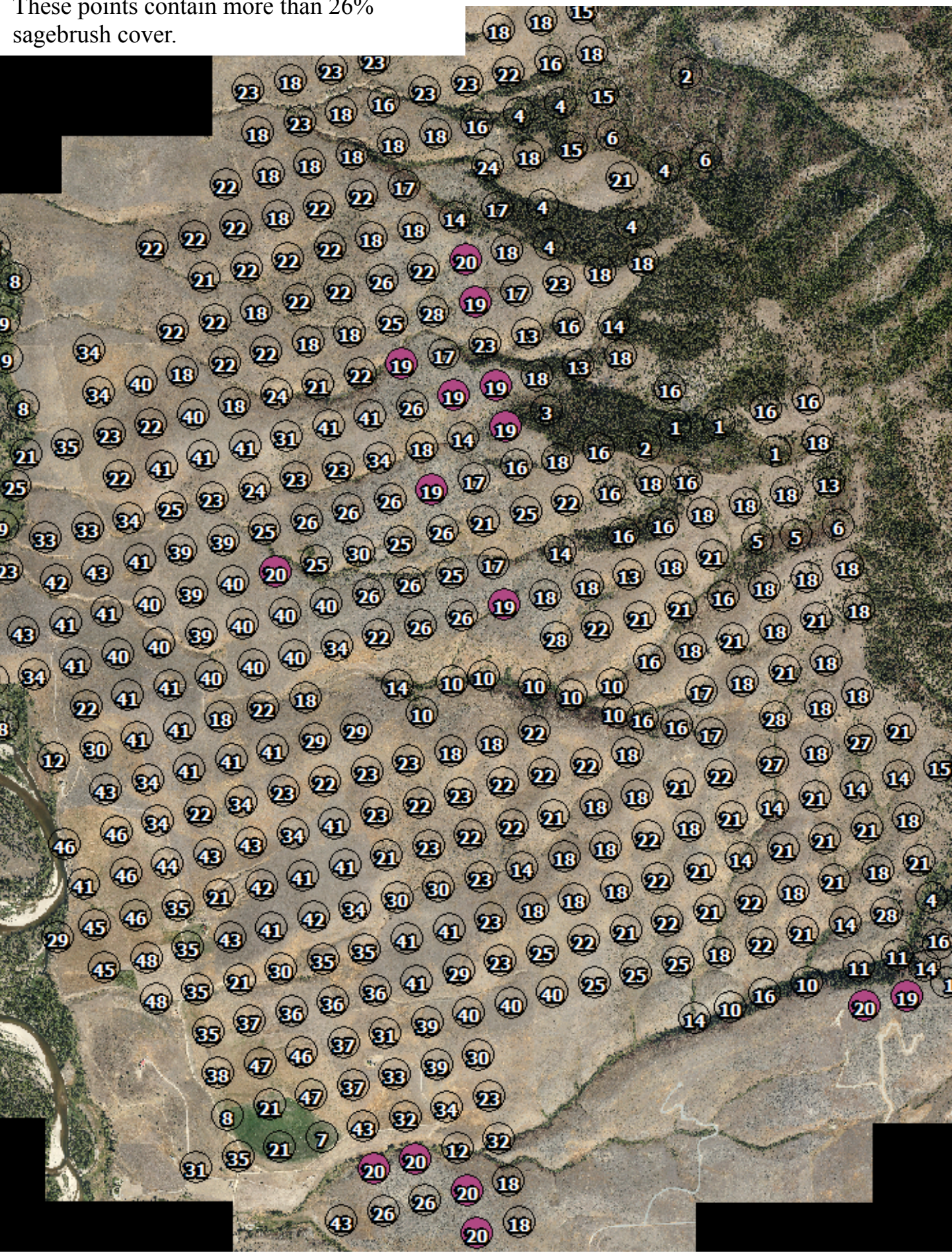
Native grasses (Bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass) dominate these plots.



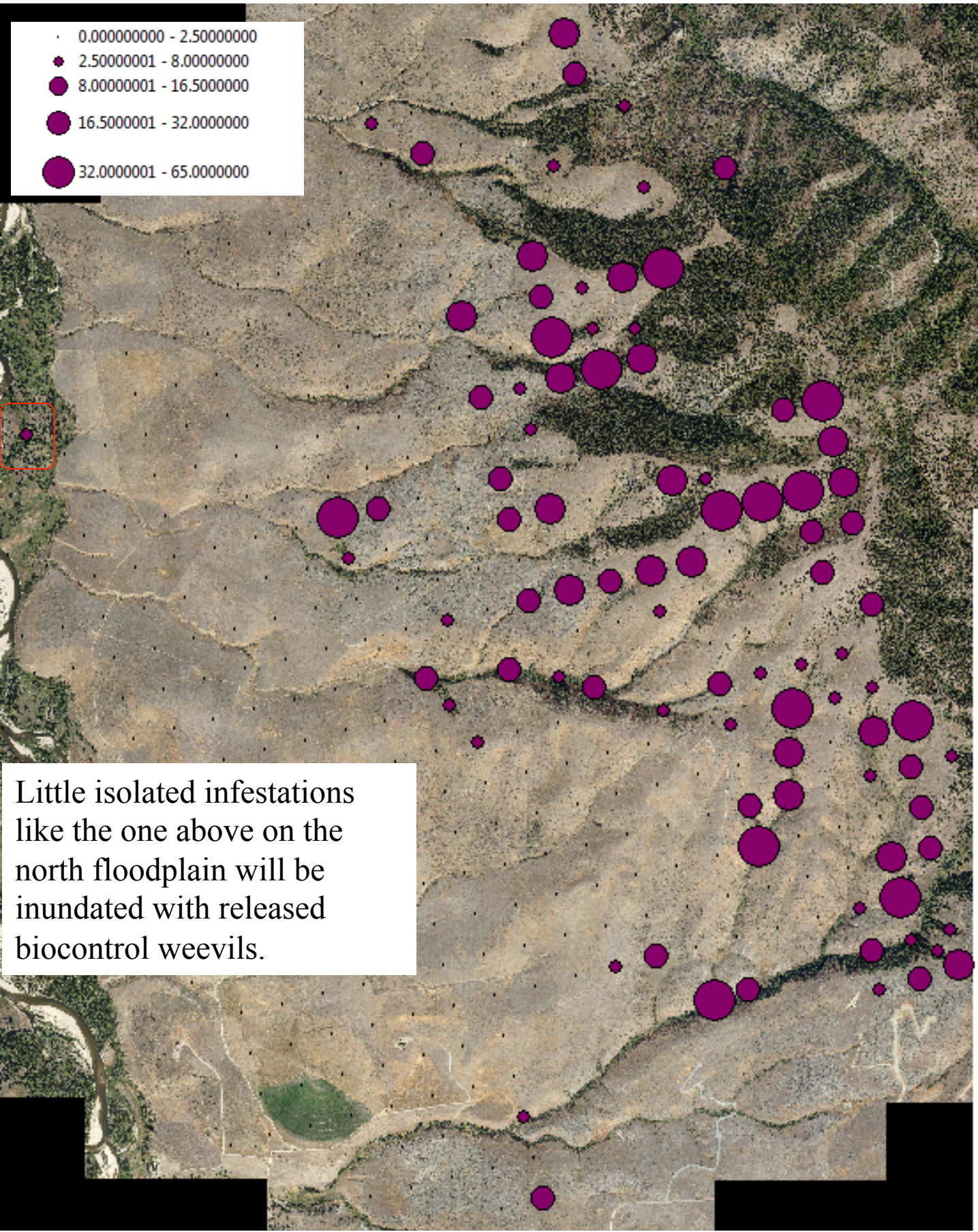
Introduced forage grasses, including crested wheatgrass, intermediate wheatgrass, and Russian wildrye dominate these plots.



These points contain more than 26% sagebrush cover.

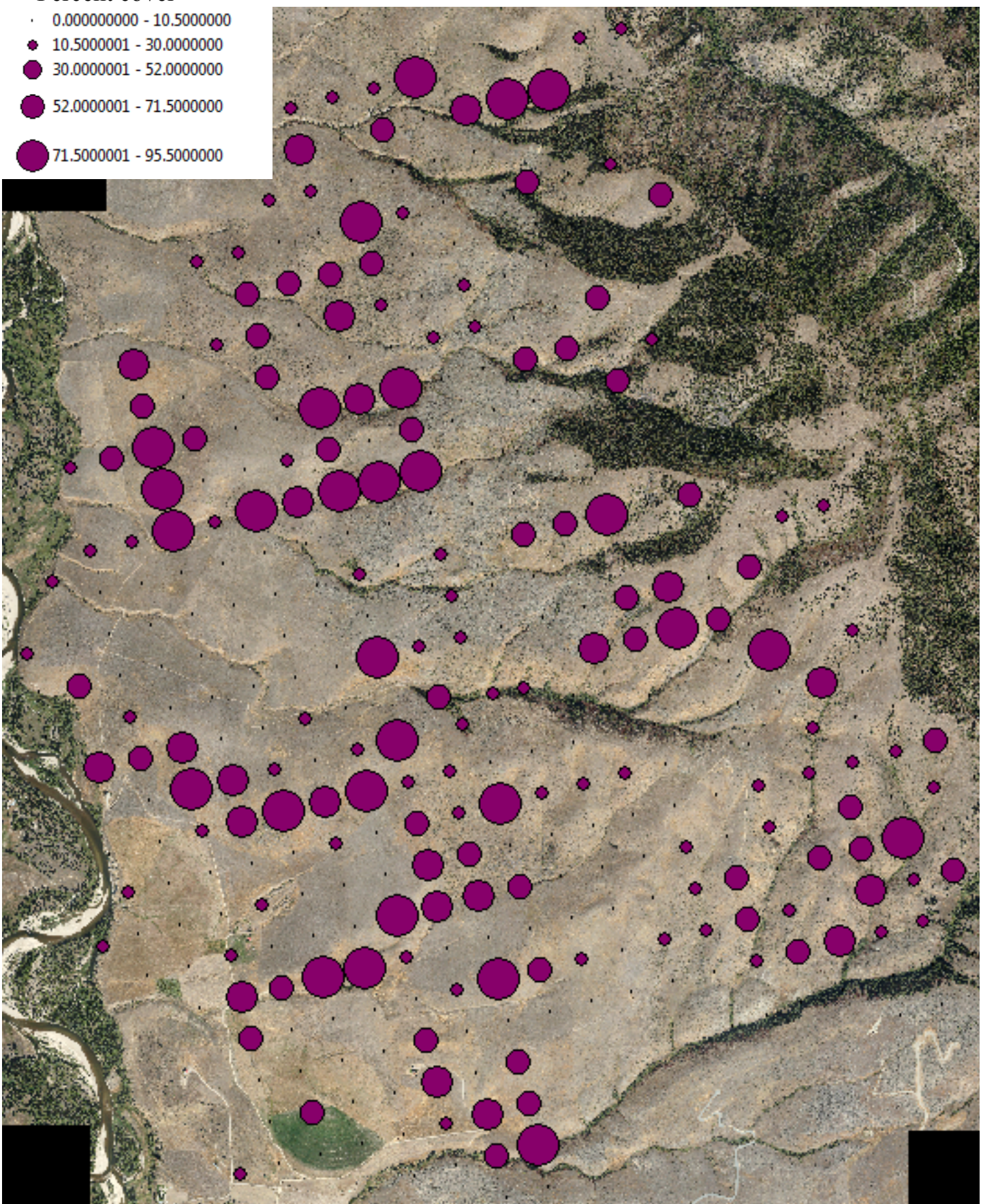
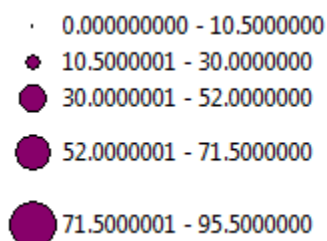


Spotted knapweed cover



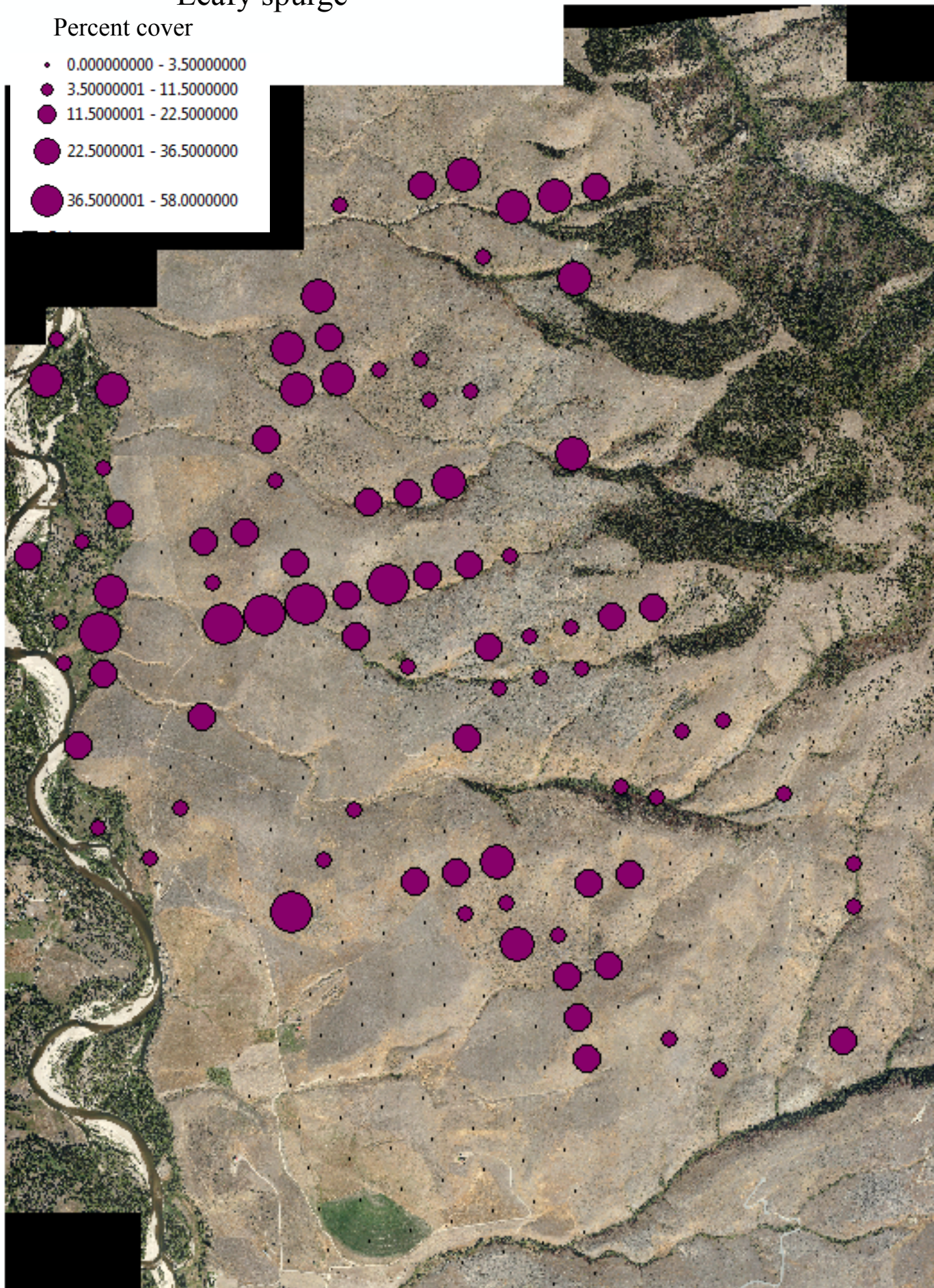
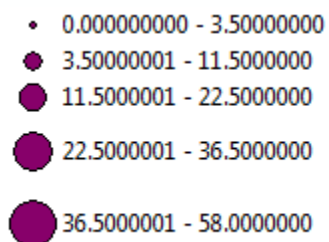
Cheatgrass

Percent cover



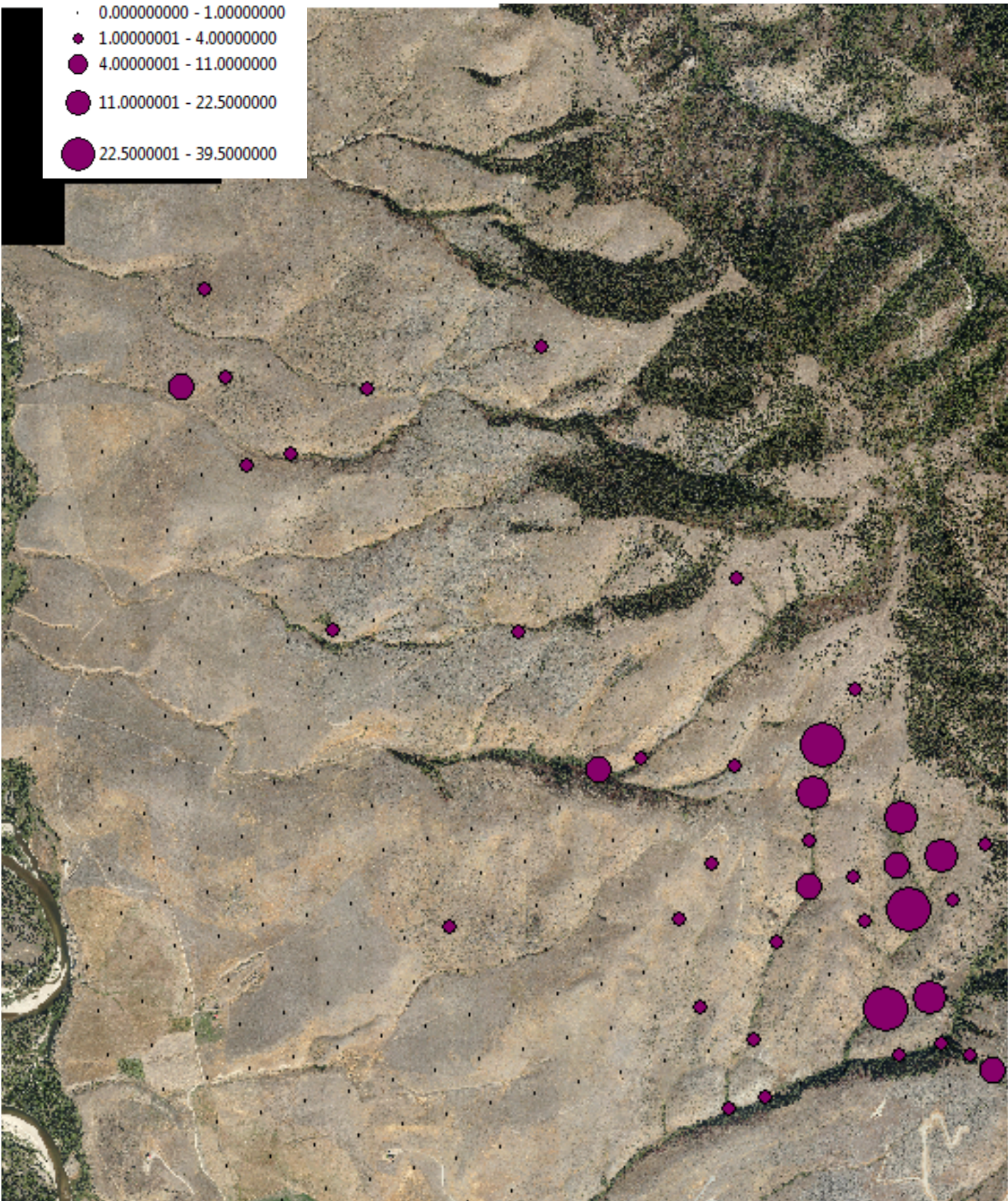
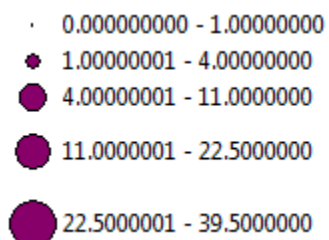
Leafy spurge

Percent cover



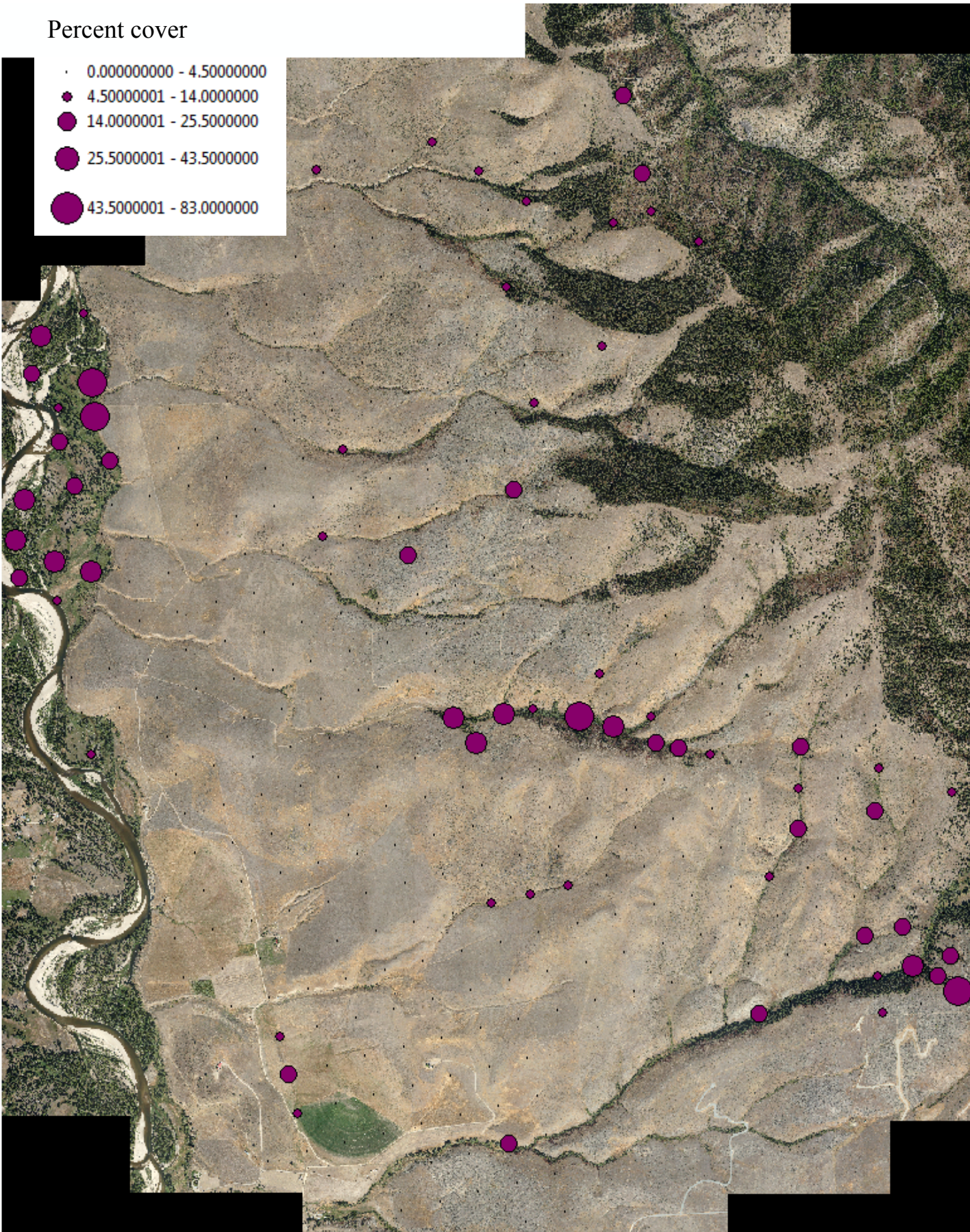
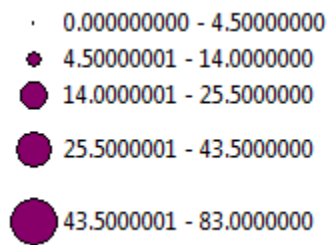
Sulphur cinquefoil

Percent cover



Kentucky bluegrass

Percent cover



Classification table listing the four dominant vegetation species within each sub-classification

Class		Dominant species		
1	Pinegrass	Ninebark	No Vegetation	Wood pussytoes
Ave	52.3	32.3	18.3	9.2
StDev	9.5	19.8	9.8	14.6
2	Pinegrass	Ninebark	No Vegetation	Snowberry
Ave	57.8	22.0	12.8	7.5
StDev	24.4	9.2	6	8.5
3	No Vegetation	Ninebark	Wheeler's bluegrass	Blue wildrye
Ave	33.5	33	12.5	10
StDev	0	0	0	0
4	No Vegetation	Ninebark	Wheeler's bluegrass	Pinegrass
Ave	34.7	33.6	16.3	7.6
StDev	21.7	13.8	7.8	10.9
5	Elk sedge	Ninebark	No Vegetation	Wheeler's bluegrass
Ave	52.8	44	5.5	5
StDev	8.1	1.4	1.4	1.4
6	Ninebark	Elk sedge	No Vegetation	Spotted knapweed
Ave	30.2	22.2	20	9
StDev	7.3	30.9	17.8	6.9
7	No Vegetation	Alfalfa	Poa sp	Redtop
Ave	45.2	26.2	4.3	3.8
StDev	44.9	45.6	7.5	6.6
8	No Vegetation	Quackgrass	Kentucky bluegrass	Leafy spurge
Ave	36.1	24.9	16.4	8.3
StDev	19.8	18.5	12.4	10.3
9	Kentucky bluegrass	Quackgrass	Snowberry	Leafy spurge
Ave	42.4	24.9	12.6	11.8
StDev	24.8	18.1	6.6	16.5
10	Kentucky bluegrass	Snowberry	Chokecherry	Ninebark
Ave	26.7	24.4	13.4	11.6
StDev	17.6	16.1	14	11.3
11	Intermediate wheat	Kentucky bluegrass	Snowberry	Mock orange
Ave	30.3	18	14.3	10.5
StDev	8.8	16.3	10.3	9.2
12	Cheatgrass	Tumble mustard	Bladder campion	Chokecherry
Ave	50	17.5	16.8	16.5
StDev	19.1	4.9	12.4	23.3
13	Cheatgrass	Spotted knapweed	Chokecherry	Elk sedge
Ave	39	30	15	14.9
StDev	27	9	11.6	29.1
14	Kentucky bluegrass	Ninebark	Spotted knapweed	No Vegetation
Ave	17.5	13.1	12.1	10.6
StDev	21.3	14.6	14.3	11.6
15	Idaho fescue	Kentucky bluegrass	No Vegetation	Slender wildrye
Ave	15.8	15	14.9	13.3
StDev	13.9	6.1	6.6	14.3
16	Idaho fescue	Bluebunch wheatgrass	Ninebark	No Vegetation
Ave	29.2	20.3	15.1	14
StDev	18.8	14.4	18	14.6

17	Idaho fescue	No Vegetation	Sagebrush	Bluebunch wheatgrass
Ave	36.4	19.6	11.4	10.1
StDev	23.9	12.2	7.7	8.5
18	Bluebunch wheatgrass	Idaho fescue	No Vegetation	Sandberg's bluegrass
Ave	24.5	22.9	17.9	10.4
StDev	12.6	20.9	11.9	7.3
19	Sagebrush	Idaho fescue	No Vegetation	Bluebunch wheatgrass
Ave	32.3	30.7	14.7	8.6
StDev	6	26.5	11.2	10.1
20	Big sage	No Vegetation	Sandberg's bluegrass	Prairie junegrass
Ave	41	26.3	16	8.1
StDev	11.8	3.9	7.5	8.2
21	Cheatgrass	No Vegetation	Bluebunch wheatgrass	Sandberg's bluegrass
Ave	33.8	20.1	17.3	14.5
StDev	21.2	16.8	13.2	6.5
22	Cheatgrass	Bluebunch wheatgrass	No Vegetation	Sandberg's bluegrass
Ave	33.8	20.1	17.3	14.5
StDev	26.2	15	11.9	11.2
23	Cheatgrass	Needle and thread	Leafy spurge	Bluebunch wheatgrass
Ave	47.3	21.8	19.5	13.1
StDev	28.3	27.3	15	11.9
24	Cheatgrass	Leafy spurge	Tumble mustard	Snowberry
Ave	60.3	18.5	16.2	9.5
StDev	12.7	6	8.3	9.3
25	No Vegetation	Bulbous bluegrass	Needle and thread	Cheatgrass
Ave	27.2	15.6	14.9	13.1
StDev	19	13.2	19.1	13.7
26	Sandberg's bluegrass	Sagebrush	No Vegetation	Intermediate wheat
Ave	22	21.3	21.1	8.2
StDev	9.1	14.8	5.9	20.8
27	Cheatgrass	Spotted knapweed	Sulphur cinquefoil	Bluebunch wheatgrass
Ave	22.5	20.5	11.3	11
StDev	1.4	2.1	13.1	6.4
28	Spotted knapweed	Cheatgrass	Needle and thread	Tumble mustard
Ave	30.9	28.6	18.6	13.3
StDev	27.3	23.5	13	21.5
29	Cheatgrass	Crested wheatgrass	Needle and thread	Bluebunch wheatgrass
Ave	47.8	19.4	13	7.6
StDev	30.1	26.6	8.8	11.5
30	Cheatgrass	Needle and thread	Bulbous bluegrass	Yellow alyssum
Ave	52.1	38.8	8.6	4.8
StDev	26.9	22	4.6	7.8
31	Needle and thread	Cheatgrass	Intermediate wheat	No Vegetation
Ave	34.5	29.8	22.2	12.7
StDev	14.7	14.8	25.9	7.5
32	Cheatgrass	Crested wheatgrass	Tumble mustard	Bulbous bluegrass
Ave	49.3	41.5	27.8	14.5
StDev	32.9	39.6	10.3	.7

33	Crested wheatgrass	No Vegetation	Cheatgrass	Small mustard
Ave	34.3	32.2	32	16.7
StDev	3.3	23.1	30.3	28.9
34	Cheatgrass	Bulbous bluegrass	Tumble mustard	No Vegetation
Ave	62	19.4	17.5	10.7
StDev	23.2	23.7	17.1	12.8
35	Cheatgrass	No Vegetation	Tumble mustard	Yellow alyssum
Ave	36.5	35.8	11.7	3.3
StDev	28.1	26.4	16.1	4.5
36	No Vegetation	Russian wildrye	Intermediate wheat	Needle and thread
Ave	39.2	32.3	19.2	8
StDev	1.2	19.6	12.6	13.9
37	No Vegetation	Russian wildrye	Crested wheatgrass	Intermediate wheat
Ave	42.3	26.7	11.7	7.5
StDev	6.8	16.2	12.1	.9
38	Intermediate wheat	No Vegetation	Kentucky bluegrass	Canada bluegrass
Ave	34	29	24.5	4
StDev	0	0	0	0
39	Intermediate wheat	Bulbous bluegrass	Russian wildrye	No Vegetation
Ave	38.8	33.1	21.2	17.5
StDev	16.1	17.8	12.7	7.8
40	Intermediate wheat	No Vegetation	Bulbous bluegrass	Sandberg's bluegrass
Ave	61.6	17.6	16	13.5
StDev	16.3	8.4	16.1	10.9
41	Intermediate wheat	Crested wheatgrass	No Vegetation	Cheatgrass
Ave	40	21.4	16	10.6
StDev	30.5	19.2	12.6	18
42	Crested wheatgrass	No Vegetation	Intermediate wheat	Bulbous bluegrass
Ave	42.3	35.8	15.2	5
StDev	10.4	15.9	1.3	8.7
43	Crested wheatgrass	No Vegetation	Bulbous bluegrass	Cheatgrass
Ave	65.7	27.4	6.5	1.4
StDev	15.6	15	9.8	1.5
44	No Vegetation	Wheat	Canada bluegrass	Intermediate wheat
Ave	55.5	42.5	1.5	.5
StDev	0	0	0	0
45	Wheat	No Vegetation	Unknown forbs	Tumble mustard
Ave	94.5	4.5	.5	.3
StDev	1.4	1.4	.7	.4
46	No Vegetation	Wheat	Stork's bill	Unknown forbs
Ave	46.2	41.3	4	3.6
StDev	11.4	15.1	8.4	3.9
47	Wheat	No Vegetation	White campion	Moth mullein
Ave	58	25.5	7.8	2.8
StDev	4.9	7.8	4.6	3.9
48	Witchgrass	No Vegetation	Bristlegrass	Pigweed
Ave	44.3	34	15	3.3
StDev	28.6	12.7	18.4	3.9

Roleček, J., Tichý, L., Zelený, D., Chytrý, M. (2009) Modified TWINSpan classification in which hierarchy respects cluster heterogeneity. *Journal of Vegetation Science* 20, 596-602.

We evaluated the classification by examining the amount of vegetation and avian variance it explains.

	Variance explained	F	P
All veg data	50%	7.8	<0.002
Native cover	51%	8.2	<0.002
Native forbs	25%	2.7	<0.002
Native grass	49%	7.7	<0.002
Shrub cover	64%	14.3	<0.002
All bird data	57%	2.0	<0.002