

## Appendix

Table 1. Plant species and frequency found in study plots at the Columbia National Wildlife Refuge. Note symbols are "n" for native and "a" for alien; "a" for annual, "ab" for annual/biennial, "p" for perennial; "h" for herbaceous, "s" for shrub, and "ss" for sub-shrub. Specific epithets follow that in Hitchcock and Cronquist (1976) and current convention (<http://plants.usda.gov/>).

Family <i>Species</i>	Frequency												Notes
	Fire Control N = 9			Fire + imazapic N = 12			Fire + glyphosate one application, N = 12			Fire + glyphosate two applications, N = 12			
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	
<b>Boraginaceae</b>													
<i>Amsinckia tessellata</i>	1	1	1	1	1	1	1	1	1	0.92	1	0.92	n, a, h
<i>Lappula redowskii</i>	0	0.11	0	0.25	0.08	0.25	0.08	0.25	0	0.25	0.25	0.08	n, a, h
<b>Caryophyllaceae</b>													
<i>Holosteum umbellatum</i>	1	1	1	1	0.58	0.67	1	1	1	1	1	0.58	a, a, h
<b>Chenopodiaceae</b>													
<i>Chenopodium leptophyllum</i>	0	0	0	0	0	0	0	0	0	0	0.08	0.08	n, a, h
<i>Salsola tragus</i>	0	0	0	0	0.67	0.17	0	0.25	0	0	0.42	0.25	a, a, h
<b>Compositae</b>													
<i>Achillea millifolium</i>	0.11	0	0	0.08	0.25	0.58	0.33	0.08	0.58	0.33	0.17	0.42	n, p, h
<i>Agoseris sp.</i>	0	0	0	0	0.5	0.25	0.17	0.17	0	0.08	0.08	0	n, p, h
<i>Agoseris grandiflora</i>	0.11	0	0.11	0.08	0.25	0.25	0.25	0	0.25	0	0	0.17	n, p, h
<i>Agoseris heterophylla</i>	0.33	0.11	0.11	0.17	0.25	0.25	0.42	0	0.08	0.5	0.17	0.08	n, a, h
<i>Antennaria dimorpha</i>	0	0	0	0	0	0	0.08	0	0	0	0	0	n, p, ss
<i>Artemisia tridentata</i>	0	0	0	0	0	0.25	0	0	0	0	0	0	n, p, s
<i>Chondrilla juncea</i>	0	0.11	0.11	0.33	0.5	0.33	0	0.08	0.08	0.17	0.17	0.17	a, p, h
<i>Conyza canadensis</i>	0	0	0	0	0.08	0.25	0	0.08	0	0	0.17	0.25	n, a, h
<i>Crepis atribarba</i>	0.22	0.56	0.67	0.08	0.25	0.25	0.08	0.33	0.42	0.42	0.42	0.42	n, p, h
<i>Ericameria nauseosa</i>	0	0	0	0	0	0.33	0	0	0	0	0	0.25	n, p, s
<i>Erigeron pumulus</i>	0	0	0	0.08	0.17	0.33	0.08	0.17	0.25	0	0	0.17	n, p, h

Family <i>Species</i>	Frequency												Notes
	Fire Control N = 9			Fire + imazapic N = 12			Fire + glyphosate one application, N = 12			Fire + glyphosate two applications, N = 12			
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	
<i>Lactuca serriola</i>	0.89	0.56	0.11	0.58	0.75	0.33	0.5	0.92	0	0.5	0.83	0	a, a, h
<i>Lagophylla ramosissima</i>	0	0.22	0.11	0.08	0.08	0.25	0	0.17	0.08	0.08	0.08	0	n, a, h
<i>Machaeranthera canescens</i>	0	0	0.22	0	0.17	0.33	0	0	0.17	0	0	0.25	n, b, h
<i>Microseris troximoides</i>	0.11	0.33	0.44	0.17	0.42	0.75	0.08	0.17	0.42	0.17	0.17	0.33	n, p, h
<i>Stephanomeria paniculata</i>	0	0	0.33	0	0.75	0.67	0	0.17	0.25	0	0.08	0.25	n, a, h
<i>Taraxacum officinale</i>	0.33	0.33	0.33	0.33	0.17	0.25	0.33	0.17	0.08	0.42	0.17	0.17	a, p, h
<i>Tragopogon dubius</i>	0.67	1	0.89	0.5	0.92	0.92	0.83	1	0.92	0.58	0.92	0.92	a, a, h
<b>Cruciferae</b>													
<i>Chorispora tenella</i>	0	0.11	0	0	0	0	0.08	0.08	0	0	0	0	a, a, h
<i>Descurainia pinnata</i>	0.22	0.44	0	0.17	0.5	0.25	0.25	0.25	0.08	0.25	0.67	0.08	n, ab, h
<i>Descurainia richardsonii</i>	0	0.44	0	0	0.17	0	0	0.33	0	0	0.42	0	n, ab, h
<i>Draba verna</i>	0	0.11	0.22	0	0	0.08	0	0.17	0.17	0.08	0.08	0.17	a, a, h
<i>Lepidium perfoliatum</i>	0.11	0.11	0	0.08	0	0	0.17	0	0	0.08	0	0	a, a, h
<i>Sisymbrium altissimum</i>	1	0.89	1	0.83	0.17	0.75	1	0.92	1	1	1	1	a, a, h
<b>Graminae</b>													
<i>Bromus tectorum</i>	1	1	1	1	1	1	1	1	1	1	1	0.83	a, a
<i>Hesperostipa comata</i>	0.11	0.22	0.22	0.42	0.58	0.58	0.17	0.42	0.42	0.5	0.5	0.5	n, p
<i>Poa bulbosa</i>	0	0	0	0	0	0	0	0	0	0.08	0.08	0.08	a, p
<i>Poa secunda</i>	1	1	1	1	1	1	1	1	1	1	1	1	n, p
<i>Pseudoroegneria spicata</i>	0.56	0.56	0.56	0.33	0.5	0.5	0.67	0.67	0.67	0.25	0.42	0.5	n, p
<i>Vulpia microstachys</i>	0	0	0.22	0.08	0.33	0.42	0.08	0.08	0.25	0.08	0.25	0.5	n, a
<i>Vulpia myuros</i>	0	0	0	0	0	0.17	0	0	0.33	0	0	0.25	n, a
<b>Hydrophyllaceae</b>													
<i>Phacelia humilis</i>	0	0	0	0	0.25	0	0	0.08	0	0	0.08	0	n, a, h
<b>Leguminosae</b>													
<i>Astragalus cf. lentiginosus</i>	0.11	0.11	0.33	0	0.17	0.58	0.08	0.33	0.42	0.08	0.17	0.67	n, p, h
<b>Liliaceae</b>													
<i>Calochortus macrocarpus</i>	0.22	0.89	0.89	0.33	1	1	0.33	1	1	0.08	1	1	n, p, h

Family <i>Species</i>	Frequency												Notes
	Fire Control N = 9			Fire + imazapic N = 12			Fire + glyphosate one application, N = 12			Fire + glyphosate two applications, N = 12			
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	
<b>Onagraceae</b>													
<i>Epilobium brachycarpum</i>	0.11	0.89	1	0.5	0.33	1	0.5	1	1	0.33	0.92	1	n, a, h
<b>Plantaginaceae</b>													
<i>Plantago patagonica</i>	0	0	0	0.25	0.08	0.25	0.17	0.08	0	0.08	0	0	n, a, h
<b>Polemoniaceae</b>													
<i>Phlox longifolia</i>	0.89	1	1	1	1	1	0.92	1	1	0.92	1	1	n, p, ss
<b>Portulacaceae</b>													
<i>Montia perfoliata</i>	0	0	0	0	0	0	0	0	0	0	0.08	0	n, a, h
<b>Ranunculaceae</b>													
<i>Delphinium nuttallianum</i>	1	1	1	1	1	0.83	1	1	1	0.92	0.92	0.67	n, p, h
<b>Umbelliferae</b>													
<i>Lomatium macrocarpum</i>	0.89	1	0.89	0.83	0.92	0.75	0.92	1	1	1	1	1	n, p, h
<i>Lomatium triternatum</i>	0.67	0.67	0.67	0.75	0.67	0.67	0.33	0.25	0.17	0.58	0.5	0.58	n, p, h
<b>Valerianaceae</b>													
<i>Plectritis macrocera</i>	0	0	0	0	0.08	0	0	0	0	0.08	0	0	n, a, h