

# Historical Vegetation of Seasonally Moist Depressions in the South Fork of the Palouse River Watershed

Bertie J. Weddell

## Introduction

This study is part of a larger study of past wetlands in the watershed of the South Fork of the Palouse River. In this region, parts of the landscape where surface water accumulates in winter and spring are capable of developing distinctive vegetation. During the last century, agricultural drainage, soil erosion, stream downcutting, and invasions of exotic species have eliminated or drastically altered these seasonally moist meadow communities of topographic depressions. Because of this extensive modification of the landscape and biota, little is known about the species composition of these wetlands prior to Euro-American settlement. The purpose of this study was to obtain information from historical records on the plant species composition of these communities. It focuses on communities typical of places where flow accumulates on the landscape, rather than on wetlands associated with water flowing through a channel.

## Methods

In late 1843 and 1844, the German botanist Charles Geyer collected plants in the “Gamass [camas] prairies” of northern Idaho and southeastern Washington (Piper 1906; M<sup>c</sup>Kelvey 1955; Cox 1999). Descriptions of his travels in this region and his catalogue were published in the *London Journal of Botany* and Hooker’s *Journal of Botany* between 1845 and 1847 and in Hooker’s *Journal of Botany* between 1848 and 1853 (Geyer 1845; 1846a,b,c; Hooker 1847a,b; Hooker 1848, 1850, 1852, 1853). These accounts provide a description of the vegetation of parts of the Palouse region during the “pre-settlement” period (that is, prior to the arrival of substantial numbers of Euro-American settlers). This advantage is offset, however, by the fact that Geyer did not collect in the type of habitat of interest in this study. The camas communities Geyer sampled were located in “high plains” above the Coeur d’Alene and Clearwater Rivers, and near Anatone, Washington. These plateaus are colder, higher in elevation, have less topographic relief, and are often rockier than the landforms of interest in this study: topographic depressions in the rolling hills of the Palouse River watershed.

To obtain information on the vegetation characteristic of topographic depressions in our study area, I had to rely on later records. In the early part of the twentieth century an account of the vegetation of the Palouse region was published by J. E. Weaver (Weaver 1917). Although this work provides information on plants of wet meadow habitats in our study area, it has the disadvantage of being published after substantial settlement had occurred, along with changes in land use and the arrival of non-native species.

These two types of historical accounts—Geyer’s pre-settlement reports from the region surrounding our study, and subsequent, post-settlement reports that included our study area—complement each other. To obtain more specific and detailed information on the vegetation of seasonally moist depressions in the Palouse watershed, I consulted the collections of the Marion Ownbey Herbarium at Washington State University and the University of Idaho Herbarium. The labels of species or subspecies that Geyer or Weaver had considered to be important in wetlands associated with non-flowing water were examined, and taxa that were collected in such habitats in our study area prior to 1917 were considered components of the seasonal wet meadow communities of the Palouse watershed.

Nomenclature follows Kartesz (1994). Information on synonyms was also obtained from Hitchcock et al. (1994).

## Results

Species that Geyer reported in wet meadows or camas prairies or plains are listed in Table 1, and species that Weaver considered important constituents of wet meadow communities are given in Table 2. Both authors noted that camas formed dense and extensive stands. Geyer stated that “a deep blue covers these extensive plains when the *Gamassia* [*Camassia*] is in full bloom” (Geyer 1846b:299-300), and “the dry elevated parts of the meadows belong exclusively to *Gamassia*; one bulb close to the other for miles and miles” (Geyer 1846b:291). Similarly, Weaver pointed out that in early spring “large areas in the wet meadows are characterized by the dark blue flowers of *Quamassia* [*Camassia*] *quamash*. . . . The individuals frequently occur as abundantly as 35-45 in a square meter” (Weaver 1917:106). Both authors also reported that western blue flag (*Iris missouriensis*), American bistort (*Polygonum bistortoides*), and species of buttercup (*Ranunculus*) were important components of wet meadow communities. According to Weaver (1917:106), *Ranunculus platyphyllus* [*Ranunculus orthorhynchus* var. *orthorhynchus*] was extremely abundant in wet meadows in early spring, and “its great numbers, combined with its profuse flowering habitat” made it extremely important in the “vernal period.”

Geyer mentioned sedges (“*Carices*”) as important constituents of wet meadow communities (Geyer 1846b:291,297; 1846c:520), but he was not specific about which members of the genus *Carex* he was referring to. Weaver identified four sedge taxa as important components of floodplain communities associated with small streams. Two of these—Nebraska sedge (*Carex nebrascensis*) and inflated sedge (*Carex vesicaria*)—were collected in wetlands characterized by non-flowing water in our study area prior to 1917, and therefore they probably occurred in seasonally moist depressions (Table 3).

Although there are some striking similarities, notably the overwhelming dominance of camas, between the seasonally wet meadows of high plateaus described by Geyer (Table 1) and those of low-lying areas described by Weaver (Table 2), there are also some notable differences between the plant communities associated with these different environments. Many of the plants that Geyer reported in wet meadows of the high plains are not mentioned by Weaver. Some of these, such as swale desert-parsley (*Lomatium ambiguum*) and woolly groundsel (*Senecio canus*), are typical of rocky soils and would be unlikely to occur in the deep, loess typical of depressional wetlands in the

Palouse River watershed. Others, such as *Balsamorhiza incana*, are associated with mid-elevation habitats.

Taxa that were considered by Weaver or Geyer to be important in wet meadows or camas meadows and were also collected in the watershed of the South Fork of the Palouse River in wet or low-lying habitats prior to 1917 are listed in Table 3. It is likely that these plants were common in seasonally moist meadows of topographic depressions in Whitman or Latah Counties prior to 1917. Specimen data indicate that in addition to camas, these wet meadow communities were characterized by several graminoids, such as tufted hairgrass (*Deschampsia cespitosa*), and members of the genera *Alopecurus*, *Agrostis*, and *Beckmannia*. A number of forbs were also collected in depressional wetlands. Members of the parsley family (Apiaceae), the smartweed family (Polygonaceae), and the buttercup family (Ranunculaceae) were particularly well represented.

The flora of wet meadow communities included many species that were also associated with either wetter and drier habitats. The plants that occurred in these wetlands shared the ability to tolerate the exigencies of the environment in topographic depressions, which was characterized by alternating periods of wet and dry soil as well as the deposition of considerable amounts of fine sediment.

The next wettest type of community was the community associated with the floodplains of small streams. Graminoids such as spike-rushes (*Eleocharis* spp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.) were prominent in this type of community (Weaver 1917:104-105). According to Weaver, field mint (*Mentha canadensis*) was “very important ecologically” in spike-rush–sedge communities, because of its “well developed and extensive rhizomes” (Weaver 1917:104).

Environments slightly drier than the seasonally wet meadows of the Palouse were characterized by meadow steppe or “prairie” species. Many forbs of the steppe communities also occurred in wet meadows. For example, meadow death-camas (*Zigadenus venenosus*), nine-leaf lomatium (*Lomatium triternatum*), velvet lupine (*Lupinus leucophyllus*), northern bedstraw (*Galium boreale*), cinquefoil (*Potentilla gracilis*), northern mule’s ears (*Wyethia amplexicaulis*), and western blue flag (*Iris missouriensis*) all occurred in wet meadows (Table 2) and also are common members of the Idaho fescue/common snowberry (*Festuca idahoensis/Symphoricarpos albus*) association that is typical of Palouse meadow steppe (Daubenmire 1970:100-102).

Another plant of both wet meadows (Table 2) and dry sites is broad-fruit mariposa (*Calochortus nitidus*). This species is endemic to the Palouse and Canyon Grasslands of eastern Washington and northern Idaho (Weddell and Lichthardt 1998). It was collected in “low ground” in Pullman in 1894 and in “flats” in Pullman in 1916, but it is now considered extirpated from Whitman County. The U.S. Fish and Wildlife Service considers it a Species of Concern, and the Washington Natural Heritage Program lists it as threatened in Washington (Washington Natural Heritage Program 1997:7,16,A-2,C-4).

## Discussion

The usefulness of historical records such as herbarium specimens depends on several factors affecting the availability, completeness, and reliability of the documentary

record. First, the value of historical documents rests in part on whether the information that was preserved is a representative and adequate sample of past conditions. Specimen collections reflect collectors' biases about what was and was not important. This kind of "cultural filtering" of the past is inherent in documentary records (Swetnam et al. 1999:1192). Second, the usefulness of historical documents depends on their clarity and completeness.

Because of these considerations, my method of reconstructing the composition of historical wetland communities is conservative. Taxa that occurred in those wetlands might not have been collected and preserved as herbarium specimens prior to 1917, or appropriate data might not have been recorded, or specimens might have been destroyed. In this study, early specimen labels often lacked a description of the habitat where a plant was collected, and any habitat information that was included was quite general. Similarly, locations were described only in very general terms, and data on associated species were not given. Finally, many specimens in the University of Idaho Herbarium collection for the period of interest were lost in a fire. For these reasons, the data from herbarium specimens provide only a partial list of plants that occurred in wet meadows in our study area prior to 1917. Species that were present in historical wetlands but were not collected or recorded in that habitat will be omitted from this reconstruction.

Nevertheless, the combination of data from specimens and from historical records provides a useful, though sketchy, glimpse of the vegetation of wet meadow communities prior to major impacts from agriculture and drainage. Information from these sources indicates that these communities were dominated by camas, accompanied by forbs from the parsley, buttercup, and smartweed families. In addition, many forbs of characteristic of meadow steppe communities and graminoids characteristic of floodplains probably were common in these seasonally moist topographic depressions.

## Acknowledgments

I thank the University of Washington Libraries, Thomas Cox, and Wes Weddell for aid in obtaining Geyer's catalog and accounts of his travels. In addition, I am grateful to Shelley M<sup>c</sup>Mahon, of the Ownbey Herbarium at Washington State University, and Linda Cook, of the University of Idaho Herbarium, for assistance with collection research. This project was funded by a grant from the Environmental Protection Agency.

## Literature Cited

- Cox, T. R. 1999. Charles A. Geyer, Pioneer botanist of Upper Oregon. *Idaho Yesterdays* 43(1):11-32.
- Daubenmire, R. F. 1970. *Steppe vegetation of Washington*. Washington Agricultural Experiment Station, Washington State University, Technical Bulletin 62.
- Geyer, C. A. 1845. Notes on the vegetation and general character of the Missouri and Oregon Territories, made during a botanical journey from the state of Missouri, across the south-pass of the Rocky Mountains, to the Pacific, during the years 1843 and 1844. *London Journal of Botany* 4:479-492.

- Geyer, C. A. 1846a. Notes on the vegetation and general character of the Missouri and Oregon Territories, made during a botanical journey in the state of Missouri, across the South Pass of the Rocky Mountains, to the Pacific, during the years 1843 and 1844. *London Journal of Botany* 5:198-208.
- Geyer, C. A. 1846b. Notes on the vegetation and general character of the Missouri and Oregon Territories, made during a botanical journey in the state of Missouri, across the South Pass of the Rocky Mountains, to the Pacific, during the years 1843 and 1844. *London Journal of Botany* 5:285-310.
- Geyer, C. A. 1846c. Notes on the vegetation and general character of the Missouri and Oregon Territories, made during a botanical journey in the state of Missouri, across the South-Pass of the Rocky Mountains, to the Pacific, during the years 1843 and 1844. *London Journal of Botany* 5:509-524.
- Hitchcock, C. L., A. Cronquist, M. Ownbey, and J. W. Thompson. 1994. *Vascular plants of the Pacific Northwest*. University of Washington Press, Seattle. 5 vols.
- Hooker, W. J. 1847a. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *London Journal of Botany* 6:65-79.
- Hooker, W. J. 1847b. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *London Journal of Botany* :206-256.
- Hooker, W. J. 1848. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *Hooker's Journal of Botany, Kew Garden Miscellany* 3:287-300.
- Hooker, W. J. 1850. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *Hooker's Journal of Botany, Kew Garden Miscellany* 5:257-265.
- Hooker, W. J. 1852. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *Hooker's Journal of Botany, Kew Garden Miscellany* 7:371-378.
- Hooker, W. J. 1853. Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. *Hooker's Journal of Botany, Kew Garden Miscellany* 8:16-19.
- Kartesz, J. 1994. *A synonymized checklist of the vascular flora of the United States, Canada, and Greenland*. Timber Press, Portland, OR. 2 vols.
- M<sup>c</sup>Kelvey, S. D. 1955. *Botanical exploration of the trans-Mississippi West, 1790-1850*. Arnold Arboretum of Harvard University, Jamaica Plain, MA.

- Piper, C. V. 1906. Flora of the state of Washington. Contributions from the United States National Herbarium, Vol. 11. Smithsonian Institution, United States National Museum, Government Printing Office, Washington, D.C.
- Swetnam, T. W., C. D. Allen, and J. L. Betancourt. 1999. Applied historical ecology: Using the past to manage for the future. *Ecological Applications* 9:1189-1206.
- Washington Natural Heritage Program. 1997. Endangered, threatened, and sensitive vascular plants of Washington—with working lists of rare non-vascular species. Department of Natural Resources. Olympia. 62 pp.
- Weaver, J. E. 1917. A study of the vegetation of southeastern Washington and adjacent Idaho. *University Studies* 17(1). Lincoln, NB.
- Weddell, B. J. and J. Lichthardt. 1998. Identification of conservation priorities for and threats to Palouse Grassland and Canyon Grassland remnants in Idaho, Washington, and Oregon. Bureau of Land Management, Technical Bulletin No. 98-13.

**Table 1. Species occurring in wet meadows or camas plains or prairies according to Geyer.** LJB = London Journal of Botany; HJB = Hooker's Journal of Botany.

Family	Genus and species (re: Geyer)	Geyer's Catalog Number	Synonym	Citation	Habitat
Apiaceae	<i>Peucedanum</i> ( <i>Ferula</i> ) <i>tenuissimum</i>	302	<i>Lomatium ambiguum</i>	LJB 5:297-298; LJB 6:235-236.	Wet, spongy meadows; wet, swampy, small prairies (high, cold region).
Apiaceae	<i>Peucedanum</i> <i>triternatum</i>	557	<i>Lomatium triternatum</i> var. <i>triternatum</i>	LJB 6:235.	Grassy prairies of the Nez Perce Indians in large, wet, open, stony places.
Asteraceae	<i>Coreopsis</i> <i>Atkinsoniana</i> ; <i>Calliopsis</i>	644	<i>Coreopsis tinctoria</i> var. <i>atkinsoniana</i>	LJB 5:291; LJB 5:298-301.	Low, moist valley meadows; wide, flat, fertile, grassy or camas plains or prairies.
Asteraceae	<i>Espeletia incana</i>	419	<i>Balsamorhiza incana</i>	LJB 5:520; LJB 6:246.	Moist, often stony plains.
Asteraceae	<i>Helenium</i> <i>autumnale</i>	589	<i>Helenium autumnale</i>	LJB 5:291; LJB 6:249.	Low, moist valley meadows.
Asteraceae	<i>Senecio canus</i>	484	<i>Senecio canus</i>	LJB 6:252.	Wet stony places, camas prairies of Nez Perce highlands.
Brassicaceae	<i>Thlaspi</i> [= " <i>Arabis</i> ?] <i>cochleariforme</i>	305	<i>Thlaspi montanum</i> var. <i>montanum</i>	LJB 5:298; LJB 6:71.	Wet, spongy meadows; High, cold swampy prairies of the Coeur d'Alene.
Iridaceae	<i>Iris Missuriensis</i> ( <i>Missourensis</i> )	--	<i>Iris missouriensis</i>	LJB 5:301; LJB 5:520.	Small, fertile meadows; moist, often stony plains.
Isoetaceae	<i>Isoetes lacustris</i>	--	<i>Isoetes lacustris</i>	LJB 5:301.	On the margin of ponds in the camas plains.
Leguminosae	<i>Trifolium</i> <i>eriocephalum</i>	379	<i>Trifolium</i> <i>eriocephalum</i>	LJB 6:208.	High, swampy meadows in the Nez Perce Mountains.
Liliaceae	<i>Amianthium</i> <i>Nuttallii</i>	374	<i>Zigadenus</i> (sp.?)	HJB 7:373.	High plains and camas prairies.
Liliaceae	<i>Camassia</i> <i>esculenta</i>	628	<i>Camassia quamash</i>	LJB 5:297; HJB 7:375.	Wet spongy meadows; high, fertile plains in wet tracts; "almost the only plant in the wet, undulated portion" of the Coeur d'Alene River..
Liliaceae	<i>Veratrum viride</i>	--	<i>Veratrum viride</i>	LJB 5:291; LJB 5:297.	Dry, elevated parts of valley meadows; wet, spongy meadows.

<b>Family</b>	<b>Genus and species (re: Geyer)</b>	<b>Geyer's Catalog Number</b>	<b>Synonym</b>	<b>Citation</b>	<b>Habitat</b>
Poaceae	<i>Aira elongata</i>	342, 490	<i>Deschampsia elongata</i>	LJB 5:291; LJB 5:297; LJB 5:298-301;  LJB 5:520; HJB 8:17.	Low, moist valley meadows (genus <i>Aira</i> ); wet, spongy meadows (genus <i>Aira</i> ); wide, flat, fertile, grassy or camas plains or prairies (genus <i>Aira</i> ); moist, often stony plains (#342); rocks and stony swamps and sides of rivulets ( <i>Aira elongata</i> #341 and #490).
Poaceae	<i>Alopecurus aristulatus</i>	323	<i>Alopecurus aequalis</i> var. <i>aequalis</i>	HJB 7:377.	Stony, loams, dried pools in camas prairie.
Poaceae	<i>Alopecurus geniculatus</i>	--	<i>Alopecurus geniculatus</i>	LJB 5:301; LJB 5:520.	On the margin of ponds in the camas plains; moist, often stony plains.
Poaceae	<i>Beckmannia erucaeformis</i>	240	<i>Beckmannia syzigachne</i>	LJB 5:520; HJB 8:18.	Moist, often stony plains (genus <i>Beckmannia</i> ); stony saline swamps.
Poaceae	<i>Panicum capillare</i>	--	<i>Panicum capillare</i>	LJB 5:291.	Low, moist valley meadows.
Poaceae	<i>Trichodium scabrum</i>	--	<i>Agrostis scabra</i>	LJB 5:291; LJB 5:298-301;  LJB 5:520.	Low, moist valley meadows; wide, flat, fertile, grassy or camas plains or prairies (genus <i>Trichodium</i> ); moist, often stony plains (genus <i>Trichodium</i> ).
Polygonaceae	<i>Polygonum Bistorta</i>	405	<i>Polygonum bistortoides</i>	LJB 5:520; HJB 5:262.	Moist, often stony plains; moist, deep, grassy meadows on high and cold plains of the Nez Perce Indians.
Ranunculaceae	<i>Myosurus minimus</i>	322	<i>Myosurus minimus</i>	LJB 5:301; LJB 6:67.	On the margin of ponds in the camas plains; borders of pools in the camas prairies.
Ranunculaceae	<i>Ranunculus Flammula</i>	306	<i>Ranunculus flammula</i>	LJB 5:298-301; LJB 6:66.	Wide, flat, fertile, grassy or camas plains or prairies; high, grassy plains.
Ranunculaceae	<i>Ranunculus hispidus</i>	303	<i>Ranunculus hispidus</i>	LJB 5:291; LJB 6:67.	Dry, elevated parts of valley meadows.
Valerianaceae	<i>Valeriana edulis</i>	237, 337	<i>Valeriana edulis</i>	LJB 5:297; LJB 6:239.	Wet, spongy meadows (#337); wet meadows, high plains (#227).
Valerianaceae	<i>Valeriana sylvatica</i>	308	<i>Valeriana dioica</i>	LJB 5:297; LJB 6:239.	Wet, spongy meadows; high, cold wet prairies within the Coeur d'Alene Mountains.

**Table 2. Taxa occurring prior to 1917 in wet meadows and floodplains of small streams in southeastern Washington and adjacent Idaho according to Weaver.** Species that Weaver considered major constituents of wet meadow communities are in bold type.

Family	Taxon (re: Weaver)	Synonym
<b>Wet meadows</b>		
Apiaceae	<i>Cicuta occidentalis</i>	<i>Cicuta douglasii</i>
Apiaceae	<i>Cogswellia triternata</i>	<i>Lomatium triternatum</i>
Apiaceae	<b><i>Heracleum lanatum</i></b>	<b><i>Heracleum maximum</i></b>
Asteraceae	<i>Senecio serra</i>	<i>Senecio serra</i>
Asteraceae	<b><i>Wyethia amplexicaulis</i></b>	<b><i>Wyethia amplexicaulis</i></b>
Clusiaceae	<i>Hypericum scouleri</i>	<i>Hypericum scouleri</i>
Cyperaceae	<i>Carex aperta</i>	<i>Carex aperta</i>
Equisetaceae	<i>Equisetum</i> spp.	<i>Equisetum</i> spp.
Fabaceae	<i>Lupinus leucophyllus</i>	<i>Lupinus leucophyllus</i>
Fabaceae	<i>Trifolium douglasii</i>	<i>Trifolium douglasii</i>
Iridaceae	<b><i>Iris missouriensis</i></b>	<b><i>Iris missouriensis</i></b>
Lamiaceae	<i>Mentha canadensis borealis</i>	<i>Mentha canadensis</i>
Lamiaceae	<i>Prunella vulgaris</i> var. <i>lanceolata</i>	<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>
Liliaceae	<i>Calochortus nitidus</i>	<i>Calochortus nitidus</i>
Liliaceae	<b><i>Hookera hyacinthina</i></b>	<b><i>Triteleia hyacinthina</i> var. <i>hyacinthina</i></b>
Liliaceae	<b><i>Quamasia quamash</i></b>	<b><i>Camassia quamash</i></b>
Liliaceae	<b><i>Veratrum californicum</i></b>	<b><i>Veratrum californicum</i></b>
Liliaceae	<i>Zygadenus venenosus</i>	<i>Zigadenus venenosus</i>
Malvaceae	<i>Sidalcea oregana</i>	<i>Sidalcea oregana</i>
Onagraceae	<i>Epilobium adenocaulon</i>	<i>Epilobium ciliatum</i> var. <i>ciliatum</i>
Poaceae	<b><i>Deschampsia caespitosa</i></b>	<b><i>Deschampsia cespitosa</i></b>
Poaceae	<i>Hordeum nodosum</i>	<i>Hordeum brachyantherum</i>
Poaceae	<i>Poa annua</i>	<i>Poa annua</i>
Poaceae	<i>Poa triflora</i>	<i>Poa palustris</i>
Polygonaceae	<b><i>Polygonum bistortoides</i></b>	<b><i>Polygonum bistortoides</i></b>
Polygonaceae	<i>Polygonum emersum</i>	<i>Polygonum amphibium</i> var. <i>emersum</i>
Polygonaceae	<i>Polygonum polygaloides</i>	<i>Polygonum polygaloides</i>
Polygonaceae	<i>Rumex mexicanus</i>	<i>Rumex salicifolius</i> var. <i>mexicanus</i>
Polygonaceae	<i>Rumex occidentalis</i>	<i>Rumex aquaticus</i> var. <i>fenestratus</i>

<b>Family</b>	<b>Taxon (re: Weaver)</b>	<b>Synonym</b>
Primulaceae	<i>Steironema ciliatum</i>	<i>Lysimachia ciliata</i>
Ranunculaceae	<i>Delphinium simplex</i>	<i>Delphinium burkei</i>
Ranunculaceae	<b><i>Ranunculus platyphyllus</i></b>	<b><i>Ranunculus orthorhynchus</i> var. <i>orthorhynchus</i></b>
Rosaceae	<i>Potentilla rectiformis</i>	<i>Potentilla gracilis</i>
Rubiaceae	<i>Galium boreale</i>	<i>Galium boreale</i>
Scrophulariaceae	<i>Castilleja miniata</i>	<i>Castilleja miniata</i>
Scrophulariaceae	<i>Orthocarpus tenuifolius</i>	<i>Orthocarpus tenuifolius</i>
<b>Floodplains of small streams</b>		
Brassicaceae	<i>Radicula curvisiliqua</i>	<i>Rorippa curvisiliqua</i> var. <i>curvisiliqua</i>
Cyperaceae	<i>Carex lanuginosa</i>	<i>Carex lanuginosa</i>
Cyperaceae	<i>Carex monile</i> var. <i>pacifica</i>	<i>Carex vesicaria</i> var. <i>pacifica</i>
Cyperaceae	<i>Carex nebrascensis</i>	<i>Carex nebrascensis</i>
Cyperaceae	<i>Carex pachystachya</i>	<i>Carex pachystachya</i>
Cyperaceae	<i>Carex utriculata</i>	<i>Carex utriculata</i>
Cyperaceae	<i>Eleocharis acicularis</i>	<i>Eleocharis acicularis</i>
Cyperaceae	<i>Eleocharis acicularis</i> var. <i>bella</i>	<i>Eleocharis bella</i>
Cyperaceae	<i>Eleocharis palustris</i>	<i>Eleocharis palustris</i>
Juncaceae	<i>Juncus balticus</i>	<i>Juncus balticus</i>
Juncaceae	<i>Juncus bufonius</i>	<i>Juncus bufonius</i>
Juncaceae	<i>Juncus ensifolius</i>	<i>Juncus ensifolius</i>
Juncaceae	<i>Juncus suksdorfii</i>	<i>Juncus nevadensis</i> var. <i>nevadensis</i>
Juncaceae	<i>Juncus tenuis</i>	<i>Juncus tenuis</i>
Lamiaceae	<i>Mentha canadensis borealis</i>	<i>Mentha canadensis</i>
Onagraceae	<i>Epilobium adenocaulon</i>	<i>Epilobium ciliatum</i> var. <i>ciliatum</i>
Poaceae	<i>Alopecurus californicus</i>	<i>Alopecurus</i> (sp.?)
Poaceae	<i>Beckmannia erucaeformis</i>	<i>Beckmannia syzigachne</i>

**Table 3. Taxa likely to have been common in seasonally moist meadows of topographic depressions in Whitman or Latah Counties prior to 1917.** The taxa listed were considered by Weaver or Geyer to be important in wet meadows or camas meadows and were also collected in the watershed of the South Fork of the Palouse River in wet or low-lying habitats prior to 1917. O = Ownbey Herbarium; I = University of Idaho Herbarium.

Family	Genus and species	Common name	Reference	Specimens			
				Collector and herbarium	Year	Habitat	Location
<b>Monocots</b>							
Cyperaceae	<i>Carex nebrascensis</i>	Nebraska sedge	Weaver	Henderson (O) Hunt (O)	1892 1906	wet meadows wet places near rr.	Union Flat Pullman
Cyperaceae	<i>Carex vesicaria</i>	inflated sedge	Weaver	Lake & Hull (O)	1892	edges of ponds	Pullman
Iridaceae	<i>Iris missouriensis</i>	western blue flag	Geyer; Weaver	Pickett (O)	1916	flats	Pullman
Liliaceae	<i>Camassia quamash</i> and <i>Camassia quamash</i> ssp. <i>quamash</i>	camas	Geyer; Weaver	Piper (O) Ransom (I) Elmer (O) Elmer (O) Hunter (O) Hunt & Kimmel (O) Pickett (O) Pickett (O) Dunkle (I)	1893 1895 1896 1897 1899 1906 1915 1916 1916	wet meadow moist places moist places swales near streams wet lowland damp ground low flat low, moist flats wet meadows	Pullman Moscow Pullman Pullman Pullman Pullman Pullman Pullman Genesee
Poaceae	<i>Agrostis scabra</i>	winter bentgrass	Geyer	Piper (O)	1894	damp ground	Pullman
Poaceae	<i>Alopecurus geniculatus</i>	water foxtail	Geyer	Hunt (O) Hunt (O)	1906 1906	wet muddy bottom low places	Pullman Pullman
Poaceae	<i>Beckmannia syzigachne</i>	American sloughgrass	Geyer	Lake & Hull (O) Piper (O) Hunt (O)	1892 1893 1906	wet ground edges of ponds wet places along railroad	Union Flat Pullman Pullman

				Specimens			
Family	Genus and species	Common name	Reference	Collector and herbarium	Year	Habitat	Location
Poaceae	<i>Deschampsia cespitosa</i>	tufted hairgrass	Weaver	Piper (O)	1893	wet ground	Pullman
<b>Dicots</b>							
Apiaceae	<i>Heracleum maximum</i>	cow-parsnip	Weaver	Hunt & Kimmel (O)	1906	near creek bottom	Pullman
Apiaceae	<i>Lomatium ambiguum</i>	swale desert-parsley	Geyer	Elmer (O)	1897?	gravelly wet soil near streams or springs	Pullman
Apiaceae	<i>Lomatium triternatum</i>	nine-leaf lomatium	Geyer	Piper (O) Aldrich (I)	1893 1910	low meadows low ground	Pullman Moscow
Asteraceae	<i>Wyethia amplexicaulis</i>	northern mule's ears	Weaver	Piper (O)	1893	wet ground	Pullman
Polygonaceae	<i>Polygonum bistortoides</i>	American bistort	Geyer	Elmer (O)	1897	very low grassy marshes	near Moscow
Polygonaceae	<i>Polygonum polygaloides</i>	white-margined knotweed	Weaver	Piper (O)	1892	moist meadows	Pullman
Ranunculaceae	<i>Myosurus minimus</i>	common mouse-tail	Geyer	Piper (O) Piper (O) Elmer (O)	1893 1894 1897	dried up ponds dried up ponds dried beds of streams and ponds	Pullman Pullman Pullman
Ranunculaceae	<i>Ranunculus orthorhynchus</i> and <i>R. orthorhynchus</i> var. <i>platyphyllus</i>	straightbeak buttercup	Weaver	Henderson (O) Piper (O) Piper (O) Pickett (O)	1894 1893 1893 1916	moist ground wet places wet ground low, damp ground	near Moscow Pullman Pullman Pullman
Valerianaceae	<i>Valeriana edulis</i>	edible valerian	Geyer	Piper (O) Pickett (O)	1893 1915	low ground low, damp flats	Pullman Pullman