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The Palouse Prairie, A Vanishing Indigenous Peoples Garden

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Photograph of a small isolated Palouse prairie patch that is quickly being colonized by non-native weeds. This photograph is a typical example of the tremendous loss of natural vegetation in the Palouse region of northern Idaho and southeastern Washington. Photograph by the author.

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Abstract

Native biodiversity has countless benefits to all peoples, but probably no more so than the people of Indigenous societies. However, with global biodiversity declining at unprecedented rates the loss is contributing to the erosion of Indigenous cultures, languages, and health. One place, where biodiversity decline has occurred at an excessive level is the Palouse prairie in the Pacific northwest. Prior to contact with Euro-Americans, the Palouse prairie was once a vast garden for Indigenous peoples. Although Indigenous peoples have relied upon the biodiversity of the Palouse for millennia, very little of the natural prairie remains. The purpose of this study was to quantify what remains of the garden (prairie) and to assess the abundance of culturally important native plants. Using remote sensing, it was found that only 1.7% of the garden remains within the region. Analysis of plot-based data revealed the frequency of food, medicinal, and other beneficial native plants is low. Steps should be taken to preserve the genetic diversity of the region before threats eliminate important native plant species. Establishment and tending to natural gardens, legal protection of prairie, and incentives to landowners to conserve prairie on private lands may help reduce the decline of native plant biodiversity.

Key Words: Palouse prairie, Indigenous, fragmentation, semiarid grassland, *Ventenata dubia*, Ethnobotany, invasive species

Introduction

The use of native biodiversity by Indigenous peoples is critical for ensuring health, opportunities for spiritual enrichment, retention of language and culture, and ecosystem stewardship. However, many acres of land that Indigenous peoples have relied upon has been destroyed and what remains is threatened by unsustainable uses, climate change (Novak, et al. 2018, 573) and the spread of non-native species. In fact, the Living Planet Index, which tracks biodiversity by measuring population abundance, shows a global decline of 60% in animal population sizes between 1970 and 2014 (WWF 2018, 7). As a result, it is becoming increasingly difficult for Indigenous peoples to practice traditional culture and interact with the native biodiversity. Although all human life depends upon biodiversity, great losses of biodiversity results directly in the ethnocide of Indigenous peoples.

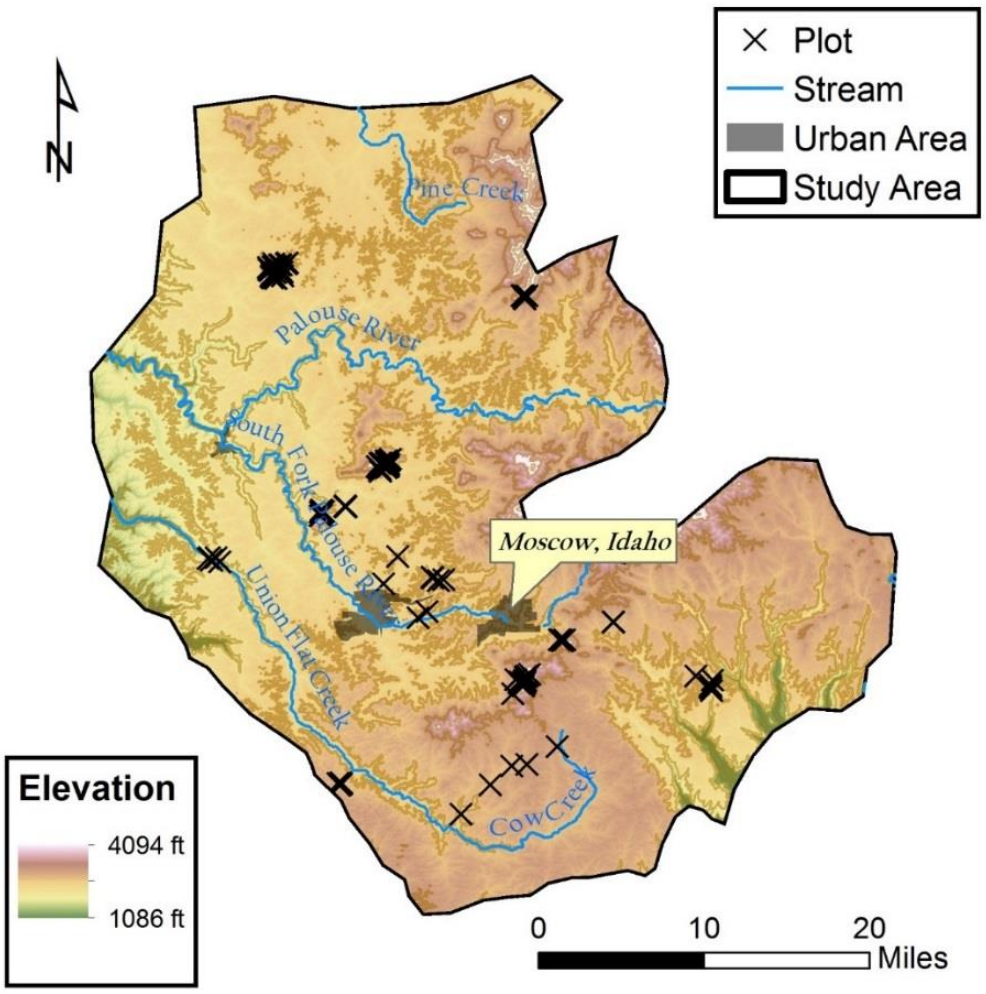

Figure 1. Study region of the Palouse prairie in northern Idaho and southeastern Washington.

One such place, where the loss of biodiversity and unwise use has occurred at an excessive level is the Palouse prairie (Figure 1). This quiet landscape with rolling hills and a pleasant, semi-arid climate was once a vast garden[†] for Indigenous peoples. This region was used by Indigenous peoples whose descendants

[†] The term "garden" was used for several reasons and its use here is interchangeable with prairie. To understand why the Palouse prairie can be regarded as a "garden" consider the following. First ethnohistoric descriptions of the Palouse region clearly recognize this area as an important gathering place of Indigenous peoples (Scheuerman and Finley 2008, 13, Frey 2001, 27, Sprague 1998, 354). In Western societies, the terms natural, wilderness, pristine, prairie, and primitive are commonly applied to landscapes that were often recognized as having little or no value. The value of prairie only increased with "improvements" that often support significant economic gains. Improvements usually involved conversion of the prairie into productive agriculture and often focused on mass production of a single beneficial non-native species. On the other hand, Indigenous societies in the Pacific Northwest normally valued areas that provided access to an abundance of fish, game, and variety of useful plants that could be consistently relied upon. The term garden has been used here to convey that "natural areas", or in this case prairie, to Indigenous peoples can be considered more valuable or at least of equal importance to the value Western societies place upon improved agriculture lands. Although it is unusual to apply the term to an entire landscape, it is also used here to convey that natural areas in Indigenous societies can be viewed much like a garden in that these areas supply food, medicine, aesthetics and many other benefits. To complicate matters further, the term "natural" is problematic too, as it is commonly understood in Western societies that natural means untouched by humans, when in fact most "natural"

are now citizens or members of the Coeur d'Alene Tribe (*Schitsu'umsh*), Kalispel Tribe of Indians, Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Colville Reservation, Nez Perce Tribe and Spokane Tribe of Indians. For millennia these peoples developed encyclopedic knowledge of the Palouse region and deeply appreciated the interconnectedness among various forms of life. An untold number of prairie plant species were gathered, stored, and prepared by women, and the efforts of women were a necessity to maintaining tribal health and wellbeing (Hunn 1990, 37, Frey 2001, 29). However, Indigenous cultures and lifeways were greatly disturbed with the arrival of Europeans. Old World infectious diseases and the combined effect of genocide by settler-colonists and the United States military decimated Indigenous populations (Sprague 1998, 352, Hunn 1990, 34-36, Scheuerman and Finley 2008, 27). The Indigenous peoples of the Palouse region who survived were subsequently forced to several Indian reservations to undergo the United States' acculturation process designed to extinguish their cultural uniqueness into a more "acceptable"[‡] Euro-American like culture.

Soon after the Indigenous inhabitants were removed, the Palouse prairie underwent a profound and devastating landscape change. Initially, Euro-Americans pastured stock (Duffin 2004, 196) and the abundant camas[§] meadows of the region attracted pig[**] farming. In fact, the pioneer community from which the town of Moscow, Idaho developed was originally called Hog Heaven (Boone 1988, 181). However, the immigrants soon discovered that the soils were prime for grain and land use switched to wheat production, which proved to be more profitable (Duffin 2004, 197). The land use change and its impact were documented with the following passage.

> ... the great Palouse prairie…, formerly a vast expanse of native bluebunch wheatgrass, Idaho fescue and other grasses, is also virtually gone. Only one tenth of one percent remains; most of the rest has been plowed and converted to wheat fields or is covered by cheatgrass and other exotic plant species (Noss and Peters 1995, 57-58).

Due to the loss of the prairie from agriculture and, more recently, exurban development (Goldberg, et al. 2011, 1), native plant habitat has been greatly diminished into small and highly fragmented patches of prairie (Looney and Eigenbrode 2012, 81). Today, what remains of the natural prairie is greatly threatened by the spread of invasive non-native weeds, especially grasses (Hill, et al. 2012, 15, Davis 2015, 17). Combined the effects of colonization and appropriation of land by the United States, has all but ruined

areas were highly managed by Indigenous societies. Indigenous valuation systems continue to be not recognized, underappreciated, and misunderstood by Western societies, especially in the United States.

[‡] From 1887-1928, United States demanded that Indigenous peoples become farmers (Deloria and Lytle 1983, 8-12) and federal policy violently forbid Indigenous customs and practices that were not considered part of civilized white American society (Dunbar-Ortiz 2014, 153-157). Vacant army posts, barracks, and other government installations were converted to training schools where Christianized church societies led the assimilation process (Deloria and Lytle 1983, 11-12). During this period, it was common practices to strip Indigenous peoples of traditional clothing, cut their hair, cloth them in army like uniforms and drill them like soldiers. The speaking of Indigenous languages was strictly forbidden. It was also during this period that the term "kill the Indian and save the man" was deplorably coined by Captain Richard H. Pratt (Dunbar-Ortiz 2014, 151). The policy of the United States towards Indigenous peoples during this period is a textbook example of ethnocide.

[§] Camas (*Camassia quamash*) was an essential root food for many groups of Indigenous peoples in the Pacific Northwest (Hunn 1990, 176).

[**] Swine will utilize the camas bulbs as fodder.

any opportunities for Indigenous peoples to access the prairie, let alone to tend the garden and make use of its bounty.

As Indigenous languages, cultures and spirituality are often intrinsically connected to the natural environment, preservation of native biodiversity contributes to preserving opportunities to practice and learn heritage languages and cultures. It is now estimated that more than half of the world's languages will become extinct by end of the century (Sampat 2001, 34), and many Indigenous peoples in North America are desperately trying to preserve their heritage languages and cultures. Natural areas can be viewed as outdoor "classrooms" where traditional ecological knowledge can be transferred by feeling, hearing, and seeing. Although not commonly recognized, difficulties with maintaining Indigenous languages and cultures is directly linked to the loss of traditional homelands and native biodiversity.

The goals of this study were to estimate what remains of the Palouse prairie and broadly assess the abundance of plant species known to be of cultural importance. The second goal of the study was to provide information about the uses and meanings of native plants by Indigenous peoples to show that the value of native plants is far beyond mere aesthetics and intrinsic worth.

Land Cover Classification Methodology

To determine what remains of the garden, a classification of cover types was created for the study region (Figure 1) from satellite imagery. The following seven cover types were classified: Prairie, Annual Grassland, Perennial Grassland, Conifer, Garbanzo, Grain, Lentil, Peas, Rapeseed, and Urban/Bare Ground. The Prairie type represents native Palouse prairie or the garden of Indigenous peoples.

The Annual and Perennial Grassland types are representative of communities dominated by non-native annual and perennial grasses. The Annual Grassland type is usually dominated by five problematic species of annual grasses including: ventenata (*Ventenata dubia*), cheatgrass (*Bromus tectorum*), soft brome (*B. hordeaceus*), bald brome (*B. racemosus*) and rat-tail fescue (*Vulpia myuros*). The Perennial Grassland type includes grazing and haying pastures, lawns, and golf courses that are mostly dominated by perennial non-native grasses. This cover type also includes areas that were formerly prairie but have since become dominated by the invasive non-native perennial grasses, such as Kentucky bluegrass (*Poa pratensis*) and tall oatgrass (*Arrhenatherum elatius*). Both annual and perennial grasslands can also include prairie that has undergone an extensive biological conversion into a novel mostly non-native plant community.

The Conifer type is mostly representative of Ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and Grand fir (*Abies grandis*). This vegetation type does support plants of cultural importance to Indigenous peoples but was not the focus of this research study. The Conifer type also includes stands of conifer trees planted for timber usually with an understory dominated by non-native species. The remaining cover types represent various domesticated crops and urban areas.

To determine the accuracy of the thematic map created, a classification accuracy assessment was completed to measure the agreement and error between ground control points and the classified image.

Abundance Methodology

To assess the abundance or bounty of culturally important plants, frequency by species was calculated for 104 plots spread within 26 patches of prairie throughout the study region (Figure 1). Patch

size varied between 0.5-739 acres, with a mean patch size of 97 acres. Frequency was estimated using canopy-coverage method (Daubenmire 1959, 50-52), and plots were located using a stratified random design with consideration to aspect and elevation (Davis 2015, 9). Actual measurements of vegetation occurred at various times throughout the growing season in 2012 and 2013. A total of 12 quadrat frames were read at each plot, and each quadrat represented an area of 1.34 ft^2.

Although many Indigenous philosophies maintain that all native species are important (Hunn 1990, 208, Davis 2015, 82), only those species with published information on cultural uses or meanings were included in the abundance assessment. Published sources were utilized because the information is readily available and within the public domain. Abundance was measured using frequency, which is defined as the total number of plots that contained at least one individual species. Percent frequency was also calculated. Percent frequency represents the percentage of time the species was observed within the total number of plots (n=104).

Land Cover Classification Results

Overall, there was a total of 15,723 acres of prairie that remains within the core area of the Palouse region. This only represents about 1.7% of the entire area. A total of 855,836 acres or 91.1% of the region has been lost to agriculture, urban development, and the invasion of non-native grasses. The classification results also identified 67,279 acres or 7.2% of conifer vegetation. Increases in conifer in the region, and other woody vegetation for that matter, may be attributed to the removal of Indigenous peoples from the landscape and fire suppression by Euro-Americans. These actions likely resulted in creating conditions favorable for increases in woody vegetation and the loss of herbaceous prairie vegetation.

Based upon the accuracy assessment of the Prairie type, this cover type classification had a user's accuracy of 91% and producer's accuracy of 44%. The user's accuracy statistic is the probability that a pixel classified on the map actually represents the category on the ground (Jensen 2005, 505-506). In other words, the user's accuracy statistic can be considered a measure of reliability in the field. The producer's accuracy is a measure of how well a certain area can be classified. The producer's accuracy and user's accuracy assessment for all cover types with associated omission and commission errors is provided in Table 1. Table 2 provides total number of acres and percent of land cover by type. Figure 2 provides an example of the classification for the Steptoe Butte region of the Palouse prairie in Washington State. Overall, the accuracy of the land cover classification of approximately 938,838 acres of the Palouse prairie region was 0.64 with a Kappa of 0.59.

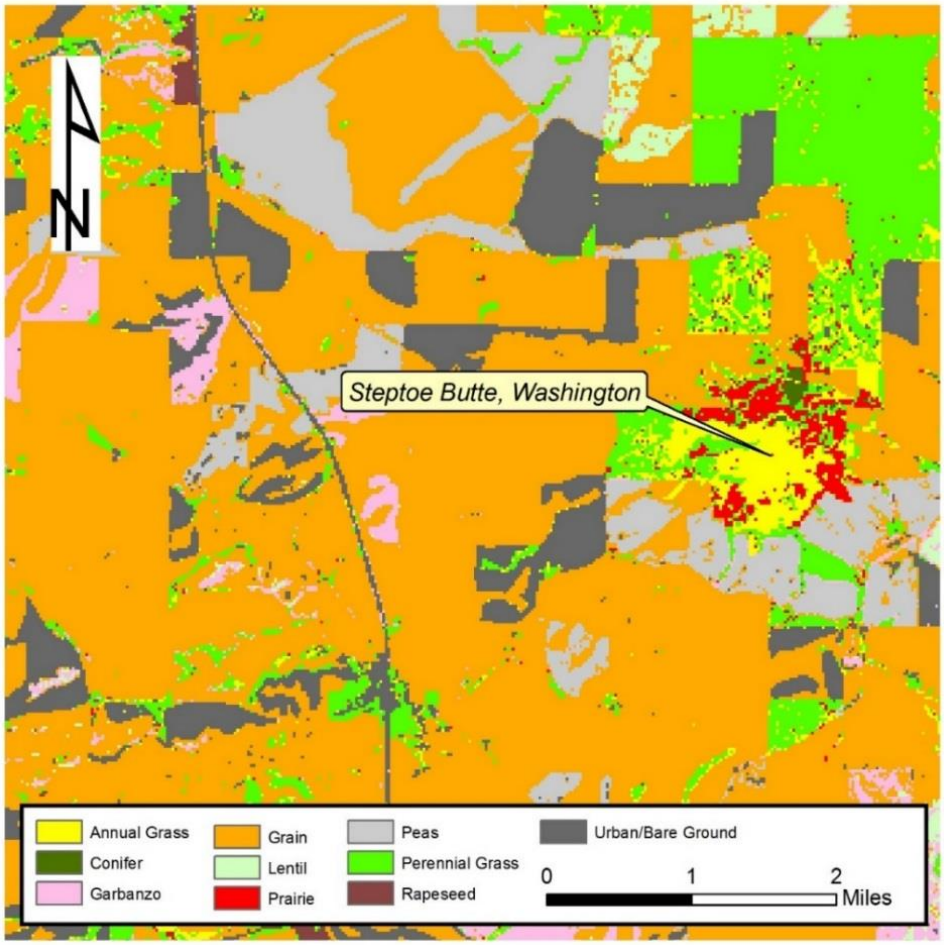

Figure 2. Land cover classification example near Steptoe Butte, Washington. Classification was based upon three fused Landsat 8 images acquired in 2013 (Davis 2015, 45).

Table 1. Producer's accuracy and user's accuracy assessment with associated omission and commission errors of the classification map for the study region.

Cover Type	**Producer's Accuracy**	**Omission Error**	**User's Accuracy**	**Commission Error**
Annual Grass	79%	21%	45%	55%
Conifer	77%	23%	92%	8%
Garbanzo	71%	29%	45%	55%
Grain	100%	0%	37%	63%
Lentil	50%	50%	80%	20%
Peas	67%	33%	100%	0%
Perennial Grass	64%	36%	50%	50%
Rapeseed	53.5%	46.5%	100%	0%
Prairie	*44%*	*56%*	*91%*	*9%*
Urban/ Bare Ground	92%	8%	88%	11%

Table 2. Estimated acres and percent of land cover types derived from imagery classification.

Cover Type	**Acres**	**Percent**
Grain	481,633	51.3%
Perennial Grassland	135,243	14.4%
Garbanzo	87,729	9.3%
Conifer	67,279	7.2%
Urban/Bare Ground	53,071	5.7%
Annual Grassland	46,153	4.9%
Lentil	31,595	3.4%
Peas	18,026	1.9%
Prairie	*15,723*	*1.7%*
Rapeseed	2,386	0.2%
TOTAL	938,838	100.0%

Garden Abundance Results

A total of 264 vascular plants, lichens, bryophytes and fungi were measured using the canopy-coverage method. However, of these only 33 species have published cultural use or meaning among local Indigenous peoples (Table 3). Overall, the frequency of culturally significant plants was low. For example, 23 species had a frequency of less than 10, and common camas was only observed twice despite the region being rich in its ethnohistorical accounts of use (Frey 2001, 27, Scheuerman and Finley 2008, 13). As more than 91.1% of the natural habitat has been lost, it is likely many more useful species were present and possibly abundant on the Palouse prior to conversion.

Although there were only 33 ethno-significant species observed, uses and meanings of these plants were diverse. Most of the plants were used for food, but many were also used for medicine and tools. One plant, nettle-leaf horsemint (*Agastache urticifolia*), may have even be used as an aphrodisiac. Some plants had multiple benefits and uses. For example, fern-leafed desert-parsley (*Lomatium dissectum*) has many uses which include: food and medicine for both humans and animals, processing animal hides, and even as a fish poison. Other plants can be used for spiritual defense or play pivotal roles in Indigenous Creation stories.

Discussion

Unwise use of the ecosystem often occurs when individuals or groups of people do not value or know how to use the native biodiversity where they live. This has occurred on the Palouse prairie where only 15,723 acres or 1.7% of the landscape was found to be native prairie, or that which remains of the relic Indigenous peoples garden. Although there is error associated with the classification, the finding is 1.69% greater than the 1995 Noss & Peters (58) report. However, Noss & Peters (1995) did not provide a methodology on their estimation, so it is difficult to evaluate the accuracy of their estimate and account for the differences.

Table 3. Ethnobotanical listing of native plants observed that have documented uses and meanings among the Plateau peoples of the Palouse region in northern Idaho and southeastern Washington. Table is arranged in decreasing order by frequency.

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
fern-leafed desert-parsley	*Lomatium dissectum*	The mid-Columbia Indigenous peoples dig up sprouts of fern-leaved desert-parsley and eat them as celery in the spring (Hunn 1990, 170), and a special thanksgiving feast is held to celebrate the onset of the harvest (Hunn 1990, 208). The root can be mashed and applied as poultice to draw out infection or applied to saddle sores on horses to improve healing (Hunn 1990, 113). An infusion of the root can also be used to treat symptoms of colds and the flu or applied as a hair rinse for dandruff (Hunn 1990, 113). Indigenous peoples at Warm Springs are reported to use the root in the processing of buckskin (Hunn 1990, 113). The root can also be used as a fish poison (Hunn 1990, 107), which is prepared by mashing a large quantity of the root on streamside rocks and applying it to a quiet stream with still pools (Hunn 1990, 113).	45	43.3%
arrowleaf balsamroot	*Balsamorhiza sagittata*	This plant is called *smukwe'shn* by the *Schitsu'umsh*, and its bloom in the spring is an indication that the root harvesting season has begun (Frey 2001, 27). The stalks of arrowleaf balsamroot are used as celery in the spring by the mid-Columbia Indigenous peoples (Hunn 1990, 170). The Nez Perce are known to use sunflower seeds, which would include arrowleaf balsamroot, as a food source (Walker 1998, 421).	37	35.6%
Wood's rose	*Rosa woodsia*	See wild rose.	19	18.3%

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
spreading dogbane	*Apocynum androsaemifolium*	The *Schitsu'umsh* made fishing lines from Indian hemp (*Apocynum cannabinum*) (Frey 2001, 29). However, Indian hemp is a larger species and the use of spreading dogbane was likely not preferred or used at all. In any case, Indian hemp was typically gathered in the summer and softened by burying it in moist soil (Hunn 1990, 189). Standing plants were harvested by October and must be dried sufficiently for processing (Hunn 1990, 189). The process began by crushing stalks to loosen the paper-tin bast fibers from the stem (Hunn 1990, 189). The bast is then shredded into separate fibers and during winters Indigenous women twined literally miles of hemp (Hunn 1990, 189). The twine was used for knotting nets and binding the hoop to the dip net shaft (Hunn 1990, 189). It can also be used to make bags for gathering roots (Hunn 1990, 189). Indian hemp is called *qéemu* in the Nez Perce language (Sonneck and Sobotta 2002, 14).	16	15.4%
common chokecherry	*Prunus virginiana*	Identified as one of the plant gifts used as foods by the *Schitsu'umsh* (Frey 2001, 155-156). According to the *Schitsu'umsh*, an appropriate harvest ceremony must take place prior to harvesting and consuming any edible berries (Frey 2001, 34). The mid-Columbia river tribes harvested common chokecherry in lowlands and foothills late June through mid-August (Hunn 1990, 178). Common chokecherry is called *tmiš* in Sahaptin (Hunn 1990, 128) and *ti'ms* in the Nez Perce language (Nez Perce Historical Park 2017).	13	12.5%
wild rose	*Rosa* sp. [native]	The wild rose is used by the mid-Columbia River Indigenous peoples as a defense against spiritual sickness that results from hauntings by the supernatural (Hunn 1990, 198). Thus, wild rose is considered a healing gift and can be used for spiritual cleansing and protection (Hunn 1990, 161, 209)	12	11.5%
creeping Oregongrape	*Mahonia repens*	Berries used as food and considered a gift from the Creator by the *Schitsu'umsh* (Frey 2001, 156). Creeping oregongrape is called *q'iq'étq'iq'et* in the Nez Perce language (Sonneck and Sobotta 2002, 14).	11	10.6%

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
western serviceberry	*Amelanchier alnifolia*	Food and part of the *Schitsu'umsh* legend of Coyote and the Rock Monster. In this legend, Rock Monster goes crazy and tears up the land and destroys trees resulting in the creation of the Palouse prairie. Coyote defeats Rock Monster by leading him into a lake. The lake turns blue from all the huckleberries and serviceberries that Rock Monster rolled over while chasing Coyote (Frey 2001, 131-134). Western serviceberry was harvested in the lowlands and foothills between late June and mid-August by the mid-Columbia river peoples. It is called *ččaa* in Sahaptin (Hunn 1990, 178). The dried fruits of Western serviceberry were also used as food by the Nez Perce (Walker 1998, 421) and called *kel* (Nez Perce Historical Park 2017). Also, see comment on common chokecherry.	10	9.6%
large-fruit desert-parsley	*Lomatium macrocarpum*	In 2001, Frey (146) wrote "probably 'Desert Parsley' (*Lomatium macrocarpum*)" or *sp'ekhwench* in the *Schitsu'umsh* language. *Sp'ekhwench* was used to heal sores before bandaging. It also has edible roots, which can be eaten raw or cooked into cakes (Frey 2001, 146).	10	9.6%
Ponderosa pine	*Pinus ponderosa*	Pine (*Pinus* sp.) can be used as pitch gum (Hunn 1990, 118, Frey 2001, 112). Among the mid-Columbia river peoples, the cambium layer of Ponderosa pine and the sugar it produced was eaten as food (Hunn 1990, 181). Ponderosa pine is called *táṗaš* in Sahaptin (Hunn 1990, 181) and *láaqa* in the Nez Perce language (Sonneck and Sobotta 2002, 14). Red pitch gum from Ponderosa pine can also be used as a poultice to the eyes to cure snow blindness (Hunn 1990, 209).	10	9.6%
black hawthorn	*Crataegus douglasii*	Food, Medicine (Moerman 1998, 183-184, Walker 1998, 421)	9	8.6%
cow-parsnip	*Heracleum maximum*	The *Schitsu'umsh* and mid-Columbia river peoples use the stems of this plant as a food, like celery (Frey 2001, 156, Hunn 1990, 113). The skin of cow-parsnip must be peeled before eating (Kuhnlein and Turner 1986, 309).	6	5.8%
Douglas' brodiaea	*Triteleia grandiflora* var. *grandiflora*	The Lewis and Clark party collected this plant on April 20, 1806 near present-day Horsethief Lake State Park in Washington and Clark wrote in his journal "there is a species of hiasinth in these plains the bulb of which the natives eat either boiled baked or dryed in the sun" (Phillips 2003, 206). Douglas' brodiaea was also documented as root food of the mid-Columbia River Indigenous peoples. Called *anałpípi* in Sahaptin (Hunn 1990, 175).	6	5.8%

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
nettle-leaf horsemint	*Agastache urticifolia*	A closely related species Western horsemint (*Agastache occidentalis*) was identified by the mid-Columbia River Indigenous peoples as an, "effective love potion, called *płaẋ winš-pamá*, 'potion [to get] your man' (Hunn 1990, 198)." It is likely that nettle-leaf horsemint was used in a similar fashion.	5	4.8%
Virginia strawberry	*Fragaria virginiana*	The Okanagan-Colville peoples used a poultice of leaf powder and deer fat for sores. Leaf powder could be applied to open sores, as well as mouth sores (Moerman 1998, 236). Fruits used as food (Moerman 1998, 235).	5	4.8%
tapertip onion	*Allium acuminatum*	Food (Frey 2001, 155, Walker 1998, 421, Moerman 1998, 56)	4	3.8%
elegant sego lily	*Calochortus elegans*	The bulb of elegant sego lily was documented as a food of the natives (Phillips 2003, 134, Hunn 1990, 90). Many other species of sego lily were used by Indigenous peoples of North America (Moerman 1998, 132-133).	4	3.8%
bristly Nootka rose	*Rosa nutkana*	See wild rose.	3	2.9%
common camas	*Camassia quamash*	Called *sqha'wlutqhwe'* in the *Schitsu'umsh* language and it was normally harvested after bloom (Frey 2001, 6). Before this plant is harvested an offering and prayer must be made to request permission to harvest. If permission is granted the Creator must be thanked for the food as it is considered a gift. Some families of *Schitsu'umsh* serve common camas during family gatherings, birthdays, Easter, Jump Dance, and Christmas, or when elders simply desire it (Frey 2001, 156). The Sahaptin term for common camas is *x̣maaš* or *wáḱamu* (Hunn 1990, 172). Common camas is a well-known food of the mid-Columbia River Indigenous peoples and many other tribes in the Pacific Northwest. Camas is prepared by the mid-Columbia River Indigenous peoples by baking it in the ground, and it was normally harvested after the bitterroot and lomatium season (Hunn 1990, 176-177). Common camas is known as *quem'e*s in the Nez Perce language and identified as a root staple of the Nez Perce and Palouse Indigenous people (Davis 2015, 100, Walker 1998, 421, Sprague 1998, 354).	2	1.9%
yellow fawn-lily	*Erythronium grandiflorum*	Documented as root food of the mid-Columbia river peoples and called *hwíḱwk* in Sahaptin (Hunn 1990, 175).	2	1.9%
yellowbell	*Fritillaria pudica*	Whole plant used as food by the mid-Columbia river peoples. Called *sikni* in in the Sahaptin language (Hunn 1990, 172,173).	2	1.9%

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
swale desert-parsley	*Lomatium ambiguum*	The Okanagan-Colville Indigenous peoples are known to use this plant for both medicine and food (Moerman 1998, 313). An infusion of Swale desert-parsley flowers and upper leaves could be taken to relieve colds and sore throats (Moerman 1998, 313). The flowers and upper leaves can also be dried and used as food and spice (Moerman 1998, 313).	2	1.9%
Gairdner's yampah	*Perideridia gairdneri*	The roots of Gairdner's yampah is used as a food by Okanagan-Colville Indigenous peoples (Moerman 1998, 386) and Nez Perce (Nez Perce Historical Park 2017, Walker 1998, 421)	2	1.9%
bittercherry	*Prunus emarginata*	The bark of bittercherry and leaves of beargrass (*Xerophyllum tenax*) were imbricated into woven baskets of cedar root to make rigid berry collecting containers (Hunn 1990, 131-132). Bittercherry was also used as a remedy to prevent a developing fetus from growing too large (Hunn 1990, 198).	2	1.9%
northern mule's-ears	*Wyethia amplexicaulis*	The stem of Northern mule's-ears can be eaten like celery (Hunn 1990, 170).	2	1.9%
wild onion	*Allium* sp.	Food (Frey 2001, 155, Walker 1998, 421, Moerman 1998, 56)	1	0.96%
sego lily	*Calochortus* sp.	See description provided for elegant sego lily.	1	0.96%
Basin wildrye	*Leymus cinereus*	The mid-Columbia River Indigenous peoples used the stems from Basin wildrye as a neutral-scented material to separate sections of cut up salmon during the drying process. It was also used as disposable floor coverings and layer material for underground cooking of camas, black tree lichen, or bear meat. Basin wildrye is called švičt in Sahaptin (Hunn 1990, 193).	1	0.96%
mountain sweet-root	*Osmorhiza berteroi*	The thick roots of mountain sweet-root are eaten by Okanagan Indigenous people (Moerman 1998, 173).	1	0.96%
wax current	*Ribes cereum*	Although probably not preferred, the berries of wax current may have been collected for food, when golden current (*Ribes aureum*; *x̣an*) and gooseberry (*Ribes lacustre*; *pínuš*) could not be found (Hunn 1990, 128). Golden current and gooseberry were harvested in the summer and ritually welcomed by the mid-Columbia River Indigenous peoples during the general harvest (Hunn 1990, 128). Currants were also identified as a traditional food of the Nez Perce (Walker 1998, 421).	1	0.96%

Common Name	Scientific Name	Use/Meaning	Frequency	Percent Frequency
red raspberry	*Rubus idaeus*	A decoction of red raspberry is used by the Okanagan-Colville Indigenous peoples for diarrhea and other gastrointestinal problems (Moerman 1998, 489). The decoction of the branches can also be used to relieve catharsis (Moerman 1998, 489). Berries used as food, eaten fresh or dried for future use (Moerman 1998, 489). Identified as food of the Nez Perce (Walker 1998, 421).	1	0.96%
big huckleberry	*Vaccinium membranaceum*	Food and called *st'shastq* by the *Schitsu'umsh* (Frey 2001, 6). A huckleberry feast is celebrated in mid-August by Plateau Indigenous peoples (Hunn 1990, 129). Big huckleberry is called wíwnu in the Sahaptin language (Hunn 1990, 129). Hunn (1990, 178) wrote "[s]ahaptin speakers agree with their Interior Salish colleagues that the most important fruit of all is the black mountain huckleberry." Dried fruits of big huckleberry are one of the most favorite winter foods of the Nez Perce and called *cemi'tk* (Nez Perce Historical Park 2017).	1	0.96%
huckleberry	*Vaccinium* sp.	See big huckleberry.	1	0.96%

Although conversion of the Palouse prairie into cropland and urban areas has resulted in substantial losses of native flora, the most severe impacts to remaining patches of prairie is the degradation caused by invasive non-native species, particularly grasses (Hill, et al. 2012, 15, Davis 2015, 17). Some of the most problematic of the non-native grass species include: ventenata, cheatgrass, soft brome, bald brome, rat-tail fescue, Kentucky bluegrass, and tall oatgrass (Davis 2015, 60). It is difficult to imagine the control of these grass species, let alone the eradication. It is more likely that these invaders will continue to alter ecosystem processes and degrade the native flora diversity of the Palouse. Furthermore, herbicide applications to invading weeds can have potential adverse effects on non-target plants and wildlife, not to mention the potential for human exposure and negative externalities to society through pesticide pollution.

The low frequency of culturally significant plants is concerning. It was expected that cous (*Lomatium cous*), Indian potato (*Claytonia lanceolata*), and bitterroot (*Lewisia rediviva*) would be observed within plots, but none of these well-known food plants were found. Nonetheless, Indian potato was observed while hiking to plots in stony areas where snow drifts. However, neither cous or bitterroot was incidentally observed while carrying out the work. Although a few historical collections of these species for the region do exist, the current status of these plants on the Palouse prairie is unknown. Frey (2001, 156) has reported bitterroot grows in the region of Spangle, Washington and Tekoa Mountain. These areas should be targeted to hopefully relocate remnant populations.

The various ethnographies used to identify plants of cultural significance, clearly demonstrate that Indigenous peoples place a high value upon native plants and landscapes within their homelands. In fact, Plateau peoples' worldview has been described as "reverential animism" as there is a high moral obligation to all lifeforms and a deep recognition of their sacrifices for the benefit of humans (Scheuerman and Finley 2008, 14). To the Coeur d'Alene other forms of life are referred to as "Peoples", all of whom share a

common kinship with humans (Frey 2001, 10). The Coeur d'Alene people also recognize native plants as gifts (Frey 2001, 153-154), and not as inanimate natural resources open to exploitation and commodification, a view commonly held in Western societies. Value is also demonstrated by the festivals and ceremonies that require access and use of native plants, and prayers offered to gain permission to harvest, ensure the plant will provide beneficial use(s) to the user, and to prevent waste.

However, the appreciation and value of native plants by the Plateau Indigenous peoples are not held by all who live in the Palouse region. Based upon a 2013 sample survey of 421 respondents of the Palouse region, it was found that the value of culturally significant plants[††] was lowest among conservative wealthy white males (Davis 2015, 95-99). Before meaningful progress towards conserving the prairie can be made, the value of native plants and prairie needs to be recognized and understood by this demographic group. It should also be mentioned that social support to conserve culturally significant plants exists among females, minority groups, liberals, individuals who are in the lower income classes, and those people who consider the Palouse region to be part of their cultural heritage (Davis 2015, 94-99). Any prairie conservation efforts should recognize these social characteristics and if possible, use them.

Despite the loss and degradation of the Indigenous peoples garden, remaining populations of native plants exist and can provide a genetic library of the Palouse biodiversity. As non-native weeds continue to increase, it is crucial that important genetic plant resources of the Palouse be preserved. Although seeds can be conserved under cold storage conditions to increase the duration of viability, efforts should also be made to plant seeds *in situ* under controlled conditions. Traditional ecological knowledge and Western science education could potentially be nurtured by facilitating native plant conservations efforts that focus upon increasing plant vigor and encouraging human-plant interactions. Potential support for such undertakings may be better achieved through collaborative partnerships with tribes, local universities, landowners, and other stakeholders.

Except for two prairie patches in Washington, (i.e., Steptoe Butte and Kamiak Butte), there is currently no grassland preserve that exists in Idaho and no formal protection is afforded to the rare prairie species, let alone plants of cultural significance that thrive on private lands. Therefore, establishment and careful management of natural areas could contribute to conserving both ethnobotanical and rare plant species, such as the Threatened Spalding's catchfly (*Silene spaldingii*) and other rare species. Another way to conserve the Indigenous peoples garden would be to expand payment for ecosystem services programs or direct purchases of Palouse prairie patches by individuals and organizations dedicated to environmental conservation.

As ethnobotanical conservation has potential to provide numerous benefits to Indigenous peoples and the ecosystem, plants and community types of ethnosignificance should be afforded some type of special status, especially on private lands. For example, plants of ethnosignificance and their habitat types could be protected by legal means through tribal, state, or federal listing processes. This is necessary as not only are these plants important to preserving Indigenous cultures, they also provide ecosystem services that benefit all. In addition to human rights, governmental organizations could also amend their constitutions to

[††] Davis (2015, 78) defined culturally significant plants as any native plant, lichen, moss, or fungus that can be used for food, teas, medicine, in ceremonies, or materials in artisan craft. The survey respondent was asked to rate how valuable culturally significant plants of the Palouse prairie are to themselves and their family. Value was rated on a scale of 1 to 5, with 1 being not valuable at all and 5 being extremely valuable.

establish rights for other forms of life and community types. Legal and administrative recognition of the rights of nature, may be necessary towards reducing the widespread ecocide that is occurring today.

Conclusion

The parallel history between Indigenous peoples and the Palouse prairie is shockingly similar. Like the Indigenous peoples of the Pacific northwest, populations of native plants were greatly reduced by invading non-native species and confined to "reservations" forever altering their community types. This is a stark reality of American history and the effects of colonialism, by plants and humans. The loss of biodiversity can be related to societal views and values of nature. Therefore, it is important that all people become more knowledgeable about the potential benefits and uses of biodiversity, it's cultural meanings and roles in maintaining the ecosystem, and how biodiversity has been impacted by colonialism and capitalism. With sharing and an understanding of how people are different from ourselves, we advance to becoming better neighbors and serving a larger more cooperative community.

Giving Back

Data used in this analysis is available upon email request to the author at clevebdavis@gmail.com.

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All the Indigenous peoples who have shared information on their traditional uses, beliefs, and philosophies with others deserve special recognition for their gifts of knowledge. This knowledge may very well represent the last hope for reversing the widespread ecocide that is occurring today.

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