

**Final Report of the *Carex constanceana* Survey  
for the Fremont – Winema National Forests**

A Challenge Cost Share Project

Between:  
USDA Forest Service  
and  
*Carex* Working Group

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**NOTE from Interagency Special Status/Sensitive Species Program:** UTM locations, Figure 10 showing unpublished data from other authors, and the plant locations in the appendices have been removed from this online version of the report at the request of the authors. If this information is needed, please contact the authors to request the full report.

## Final Report of the *Carex constanceana* Survey for the Fremont – Winema National Forests

### SUMMARY

Before 1990, *Carex constanceana* was known from only one site on Mt. Adams, Washington, where it was collected by Wilhelm Suksdorf in 1898 and 1909 (Figure 1). It has been sought there repeatedly but not relocated, and it is presumed to be extirpated. Some botanists (e.g. Hitchcock et al. 1961) have treated *C. constanceana* as a synonym of *C. petasata*, because both have gradually tapering perigynia over 6 mm long. However, other botanists (e.g. Mastrogiuseppe et al. 2002) have considered *C. constanceana*'s fewer spikes, proportionately smaller pistillate scales that reveal the perigynium beaks, and more spreading perigynia as evidence that the two were not the same. This disagreement was impossible to resolve until additional samples of *C. constanceana* were found.

**Figure 1. Isotype of *Carex constanceana*; Suksdorf 6864 from Mount Adams, Washington, collected in 1909; specimen from MICH.**



In 1999, Andrew Hipp collected plants he identified as *C. constanceana* at the Sagehen Experimental Forest in the central Sierra Nevada, California (Hipp et al. 2006).

Subsequently, a specimen that Jimmy Kagan had collected in 1996 in the Deep Creek drainage of the north Warner Mountains, Lake County, Oregon, was also identified as *C. constanceana*. Because this collection site was on Fremont-Winema National Forest land, the Forest contracted with *Carex* Working Group to conduct a survey for the plant in southeast Oregon.

We were unable to relocate *C. constanceana* at Kagan's Deep Creek site. We collected plants there with tapering perigynia 6 mm and more long. We initially identified them as *C. constanceana* but they are probably unusual *C. multicosata*. We did find a tiny, previously unknown *Carex constanceana* population on private land in the Dairy Creek drainage 42 miles northwest of Deep Creek.

Both morphological and DNA sequence evidence indicates that *Carex constanceana* should not be treated as a synonym of *C. petasata*, but it is the same as *C. davyi*, a moderately rare sedge previously known only from the Sierra Nevada of California.

During field work for this study, other interesting *Carex* species were located on Forest Service property in the North Warner Mountains, including *Carex cordillerana* (ORNHIC List2), *C. heteroneura*, *C. vernacula* (ORNHIC List 2) and a form of *C. raynoldsii* with gray perigynia. The attempt to understand the Deep Creek sedges with long perigynia revealed nomenclatural problems with *Carex multicosata* and relatives.

In this report, longer Tables and Figures are grouped near the end.

## IMPORTANT BACKGROUND INFORMATION

**Important sedges in this study:** This study revolves mainly around five taxa, *Carex constanceana*, *C. davyi*, *C. multicosata* (northern, = *C. pachycarpa*), *C. petasata*, and *C. specifica* (Table 1). All are caespitose sedges of upland habitats. *Carex constanceana* resembles *C. davyi*.

**Table 1. Selected traits of *Carex constanceana* and other upland sedges important to this study.** Data from Mastrogiuseppe (2002). Infl. = inflorescence. Peri = perigynia

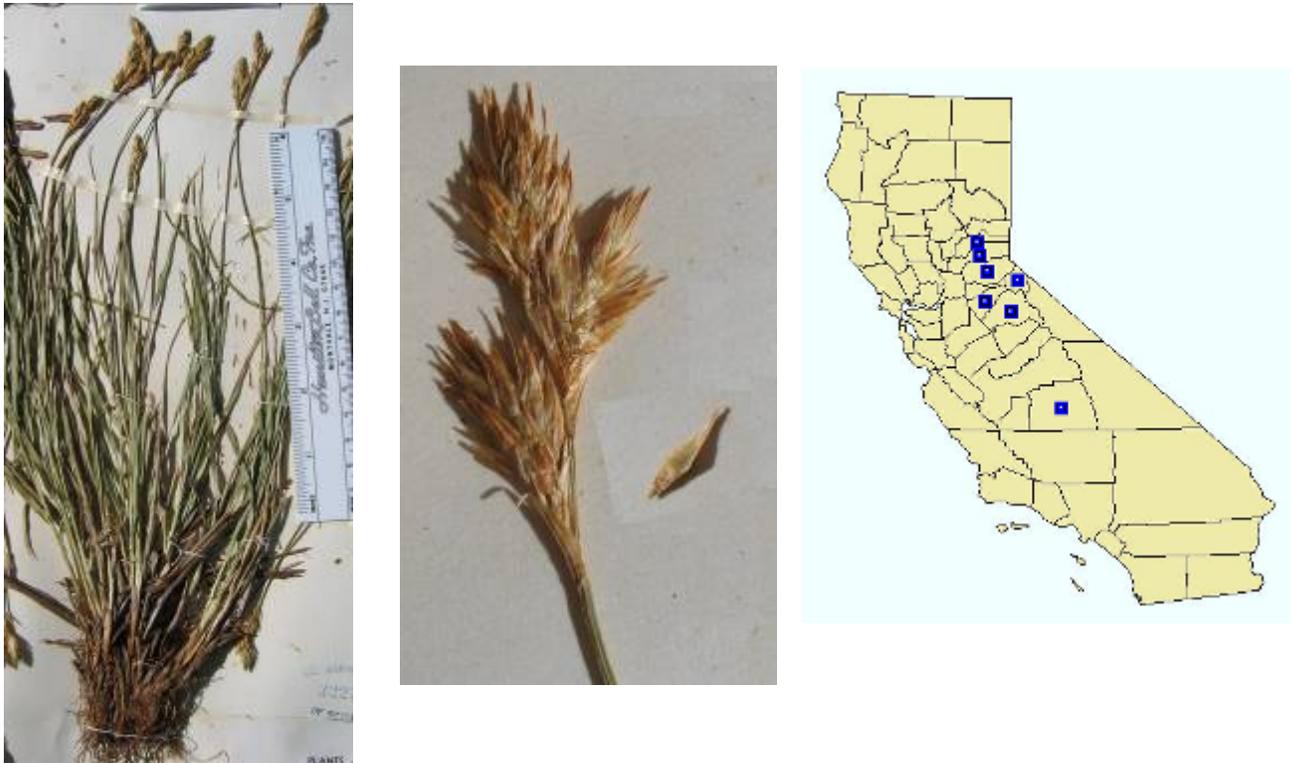
Trait	<i>C. constanceana</i>	<i>C. davyi</i>	<i>C. multicosata</i>	<i>C. petasata</i>	<i>C. specifica</i>
Plant height	25 – 35 cm	23 – 37 cm	15 – 110 cm	30 – 85 cm	50 – 85 cm
Infl. shape	short, narrow	short, narrow	ovoid	elongate	elongate (or ovoid)
Spikes / Infl.	3 – 7	(1-) 2 – 3	4 – 6	(3-) 4 – 7	5 – 14
Pistillate scales	reveal peri beak	reveal peri beak	reveal peri beak	hide peri beak	reveal or hide peri beak
Peri length	6.8 – 7.5 mm	5.9 – 8.5 mm	4.4 – 5.5 (-6) mm	6 – 8 mm	4.9 – 6.3 mm
Peri shape	lanceolate	lanceolate	ovate (rarely lanceolate)	lanceolate	lanceolate (ovate in S)

**Nomenclatural Note:** Throughout this paper, we refer to sedges by the names that have traditionally been used for them, but research performed for this study has upset the

nomenclature of both *C. constanceana* and *C. multicosata*. Nomenclature of these and some related species is likely to change.

***Carex davyi*:** *Carex davyi* has been thought of as a California endemic, growing in upland, subalpine conifer forest at 1500 to 3200 meters elevation (Figure 2). It resembles *C. constanceana* in its large perigynia (5.9 to 8.5 mm long). California plants identified as *C. constanceana* (Hipp et al. 2006; specimens Hipp 800, Zika 23919, 23920, and 23921) were collected in an area where *C. davyi* is known to grow. *C. davyi* is reported to have fewer, narrower spikes than *C. constanceana* and more acute pistillate scales (Mastrogiuseppe 2002).

**Figure 2. *Carex davyi* and its range in California.** Map from the Jepson Interchange: [http://ucjeps.berkeley.edu/cgi-bin/get\\_smasch\\_county.pl?taxon\\_id=17365](http://ucjeps.berkeley.edu/cgi-bin/get_smasch_county.pl?taxon_id=17365)



*Carex davyi* is on the California Native Plant Society (CNPS) Watch List (List 4.3). It has a limited distribution but is considered to be not very endangered in California, given a state rank of 3.3, with 21 – 80 populations known (California Native Plant Society Rare Plant Inventory 2009).

*Carex davyi* is known from Alpine, Amador, Calaveras, El Dorado, Nevada, Placer, and Tuolumne Counties (Jepson Interchange 2009; Figure 2). It has been reported from Mono County in northeastern California, but we examined the Mono County specimens and found them to be *C. praegracilis*, which differs from *C. davyi* in about as many traits

as is possible, considering that both species are in *Carex* subgenus *Vignea*. We have not seen a specimen to confirm the report of *C. davyi* from Tulare County (Figure 2). This map dot is based on an old record that is not listed on the CNPS website, and we suspect that it is a misidentification.

***Carex multicosata*:** Some botanists consider this taxon mysterious. To an Oregon botanist, the mystery seems limited; the thickened perigynium surface provides a subtle but distinctive trait for identifying this species. However, *Carex multicosata* taxonomy turns out to be very confusing in California. There, two entities have the thickened perigynium surface and are called *C. multicosata*. The northern form (which occurs as far north as Washington) has pale, green to tan, ovoid inflorescences. This taxon has been called *C. pachycarpa*, and probably should be called that again. The southern form, found mostly at higher elevations, has longer, browner inflorescences. The name *C. multicosata* belongs to the southern form. Both forms can be surprisingly difficult to distinguish from *C. specifica*.

***C. petasata*:** This unusual sedge grows in sagebrush steppe. Like *C. constanceana* and *C. davyi*, it has long, lanceolate perigynia (6 – 8 mm long). Its inflorescence is narrow and erect, and the broad hyaline margins of its pistillate scales give it an overall pale color, darker than *C. constanceana* and *C. davyi*.

***C. specifica*:** This species is widespread in California and should be looked for in Oregon. Typical northern plants have long, narrowly lanceolate perigynia. However, southern plants have shorter, ovate perigynia, so the range of perigynium lengths is large (4.9 – 6.3 mm). Usually, the inflorescence is elongated and crowded with 8 or more perigynia, but some individuals have fewer. Perigynium texture and number of apparent nerves should distinguish *C. specifica* from both forms of *C. multicosata*, but some specimens are hard to identify with confidence.

## METHODS

**Field Work:** The *Carex* Working Group visited Deep Creek and numerous other sites in the North Warner Mountains (Table 6). At Deep Creek we worked most intensively along Deep Creek and Road 4015 between the junctions with Road 3915 and Spur 019. We worked along the floodplain to some extent but mainly on the north-facing slope above the road because *C. constanceana* is an upland species. Most of the other sites visited in the North Warners were chosen because of their ecological similarity to the Deep Creek site; they had *Pinus ponderosa* – *Abies concolor* forest on north-facing slopes, usually with openings dominated by *Artemisia tridentata*. Following the discovery of a tiny *C. constanceana* population in the Dairy Creek drainage near the Gearhart Wilderness, additional sites in that area were visited. Some of these sites were chosen for their similarity to the Deep Creek site, and others because they were nearly flat and had ephemeral stream channels, like the site in the Dairy Creek drainage.

At each site, the presence or absence of *C. constanceana*, *C. petasata*, and *C. multicosata* was noted (Table 6). We recorded *C. petasata* occurrences because this species has long perigynia like *C. constanceana* and the two have sometimes been

considered synonyms. We recorded *C. multicosata* occurrences because some individuals at Deep Creek had long perigynia like *C. constanceana* but in most traits resembled *C. multicosata*. At many sites, voucher specimens were collected.

**Morphometric Analysis:** We compared morphology of known and suspected *C. constanceana* specimens to *C. petasata* and *C. davyi* (chosen because both taxa have long, lanceolate perigynia, like *C. constanceana*), *C. multicosata* (chosen because some Deep Creek specimens appeared intermediate between *C. constanceana* and typical *C. multicosata*), and *C. specifica* (a Californian taxon chosen because of its resemblance to the specimens with long perigynia collected at Deep Creek). Several traits of the leaves and inflorescence were recorded (Table 7). We examined specimens from these herbaria: BH, CAS, DS, GH, JEPS, MICH, NY, ORE, OSC, RSA, UC, WILLU, WS, and WTU (Appendix 1). Type specimens of *C. constanceana*, *C. davyi*, and *C. pachycarpa* were examined. Principal components analysis (PCA) and other statistical analyses were performed in NCSS (Hintze 2001). The traits listed (Table 7) were used in the PCA.

Categorical traits were each divided into two alternatives (ie., white dorsal sutures vs. brown dorsal sutures, or pistillate scales subequal to vs. shorter than the perigynia) and was scored for the presence or absence of one alternative and then, separately, for the other. Thus, a sample could be scored 1 for white dorsal sutures and 1 for brown dorsal sutures, if the perigynia varied in the one specimen.

PCA was used to test two hypotheses: (1) Are the Deep Creek plants with long perigynia really *C. constanceana*, or hybrids involving *C. multicosata*, or some other taxon such as *C. petasata* or *C. specifica*? (2) Is *Carex constanceana* different from Californian *C. davyi*?

**DNA Sequences:** Several *Carex* collected during this study were included in a DNA sequence analysis (Table 2). DNA was isolated using a modified CTAB method as implemented in the DNeasy kit (QIAGEN: Valencia, CA). Three nuclear ribosomal DNA (nrDNA) regions were amplified: the two internal transcribed spacers (ITS1 and ITS2), and a portion of the external transcribed spacer (ETS). All regions were sequenced in both the forward and reverse direction. Polymerase chain reaction (PCR), cycle sequencing, and cleanups were performed as described in previous work on the genus (Hipp et al. 2006). All molecular reactions were performed in the molecular systematics lab of The Morton Arboretum, and all sequencing was performed at the Pritzker Laboratory of the Field Museum, both in Illinois. Sequences were edited in Sequencher (Gene Codes Corporation: Ann Arbor, MI) and manually aligned in BioEdit (Hall 1999). Due to a near absence of indels, alignments are unambiguous. Sequence data was analyzed using neighbor joining to produce a tree with branch lengths that represent estimated substitutions per site, and branch support values estimated using maximum parsimony non-parametric bootstrapping. Details on all aspects of analysis mirror analyses conducted in Hipp et al. (2006).

**Table 2. *Carex constanceana*, *C. multicosata*, and *C. petasata* specimens collected during this study that were used in DNA sequence analysis.** All plants were collected in Lake County, Oregon. Map datum WGS84; UTM Zone 10. \* BLW 15062 was a seed collection; one of the seedlings germinated in the greenhouse was used.

Number	Date	Species	Region	UTM E	UTM N	Elev. (ft)
BLW 15062	*	<i>C. constanceana</i>	Gearhart			6065
BLW 15063	4-Aug-08	<i>C. constanceana</i>	Gearhart			6065
NO 2185	4-Aug-08	<i>C. constanceana</i>	Gearhart			6050
BLW 14951	10-Jul-08	<i>C. multicosata</i>	N. Warners			5800
BLW 14964	10-Jul-08	<i>C. multicosata</i>	N. Warners			6987
BLW 15014	24-Jul-08	<i>C. multicosata</i>	N. Warners			5800
BLW 15017	24-Jul-08	<i>C. multicosata</i>	N. Warners			4808
BLW 15092	7-Aug-08	<i>C. multicosata</i>	Gearhart			6678
NO 1945B	10-Jul-08	<i>C. multicosata</i>	N. Warners			5800
NO 2190	8-Aug-08	<i>C. multicosata</i>	Gearhart			5950
BLW 14950	9-Jul-08	<i>C. petasata</i>	N. Warners			5024
BLW 15019	24-Jul-08	<i>C. petasata</i>	N. Warners			5749

**Seed Germination:** Amy Bartow of the USDA NRCS Plant Materials Center in Corvallis, Oregon, germinated seeds of both *C. multicosata* and *C. constanceana*. The *C. multicosata* seeds came from several individuals from Deep Creek, Lake County, Oregon, and the *C. constanceana* seeds were collected from the plant *Otting 2185* (Table 1). To break dormancy, she used cold stratification lasting about three months.

**Rare Plant Reports:** Rare plant reports were completed for *C. cordillerana*, *C. constanceana*, and *C. vernacula*. These reports have been submitted to ORNHIC and are included with this report (Appendix 2).

## RESULTS AND DISCUSSION

**North Warners:** We were unable to relocate plants that matched Kagan's *C. constanceana* specimen at Deep Creek (Figure 3). Habitat at the Deep Creek site is *Pinus ponderosa* – *Abies concolor* forest low on a north-facing slope, with occasional aspen groves and *Artemisia*-dominated openings. We did not explore in any detail an area of mostly bare substrate with much *Perideridia*. This habitat may be more important than we initially realized; it is the part of the Deep Creek site that is most similar to habitat occupied by *C. constanceana* at the Dairy Creek site (see next).

**Figure 3. Deep Creek area where Kagan found *Carex constanceana* in 1996, and where it was sought in 2008.** 1 = the larger *C. cordillerana* population. 2 = habitat to search again for *C. constanceana*. 3 = population of *C. multicosata*, many with unusually long perigynia, just south of road.



At Deep Creek we found several upland sedges with lanceolate perigynia more than 6 mm long (up to 6.7 mm long in some cases). In most cases, their inflorescences were somewhat elongated (Figure 4). They could be keyed to *C. constanceana*. However, in coloration and general appearance, they resembled more common plants that were obviously *C. multicosata*. (*Carex multicosata* has tightly ovate inflorescences and perigynia usually about 4.5-5.8 mm long and ovate.) At the time of this report, we think they are unusual *C. multicosata*. (These plants have some resemblance to *C. specifica*, a California endemic, in perigynium length and shape. Their inflorescences are more elongate than is typical of *C. multicosata*, but not as elongate as is typical of *C. specifica*. Their perigynium texture is typical of *C. multicosata*.)

**Figure 4. Typical *Carex multicosata* (= *C. pachycarpa*), left, and a Deep Creek specimen with some lanceolate perigynia (right).**



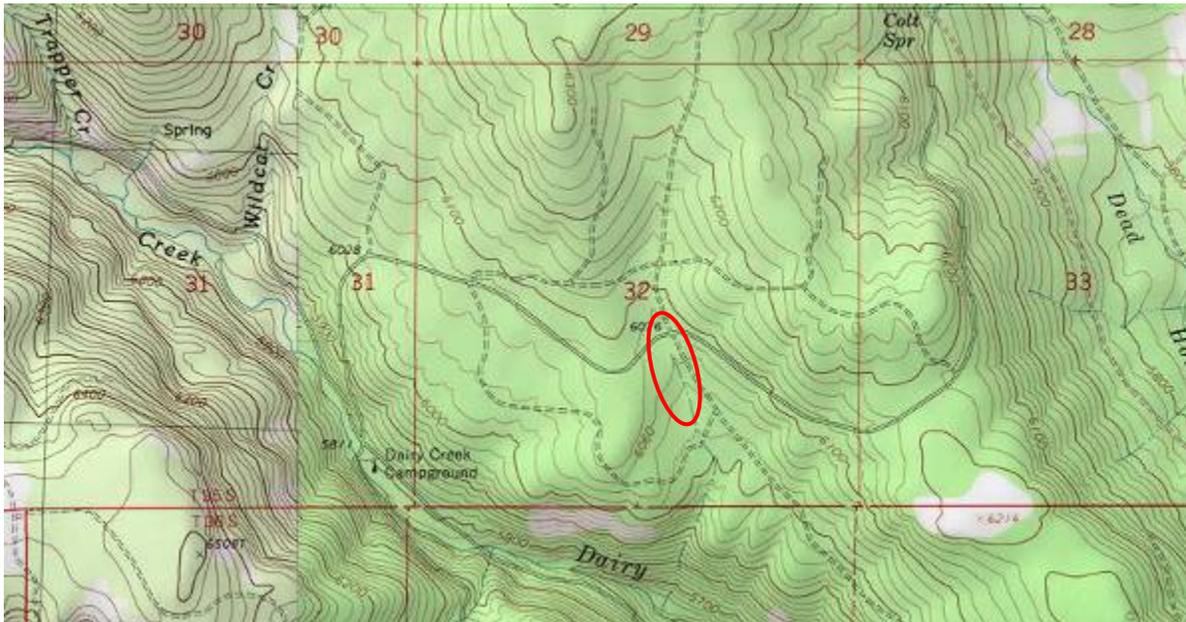
At Deep Creek, a few plants of *C. petasata* were also found. They had long perigynia covered by the scales. It is unusual for this species to grow with *C. multicosata*. *Carex petasata* is a species of sagebrush steppe, found mostly at 3000 – 7000 feet elevation in Oregon, and *C. multicosata* grows in upland grasslands, mostly at 5000 – 9000 feet elevation in Oregon ([Oregon State University Herbarium Vascular Plant Database 2009](#)).

Typical *Carex multicosata* is common in upland sites in the North Warners ([Table 6](#)).

Near Willow Creek, we found one plant that looked like *C. multicosata* but had long perigynia. It resembled the unusual Deep Creek plants that we initially called *C. constanceana* but later decided were unusual *C. multicosata*. *Carex multicosata* was found at this site and a *C. petasata* population was found about 1.3 kilometers away.

**Dairy Creek area:** On August 4, we found four plants of *Carex constanceana* along Road 34 in Lake County, two north of the road and two south of and within sight of it ([Table 6](#); [Figure 5](#)). On August 7, three additional plants were found further south in this drainage. All plants were on private land.

**Figure 5. Site on Highway 34, Lake County, *Carex constanceana* was found.**



The *Carex constanceana* occurs in a gentle headwater drainage in an area where patches of mixed conifer forest alternate with large open areas ([Figure 6](#)). Some openings are covered with perennial grasses such as *Danthonia californica* but many consist of mostly bare soil or have sparse cover of annual grasses. The woods are dominated by *Pinus contorta* and have a few large old *P. ponderosa* and *Abies concolor* and a number of

large stumps, suggesting that those species had been more common before logging. There is a little *Populus tremuloides* along the drainage. The entire area slopes slightly to the south and is crossed by shallow, ephemeral channels.

**Figure 6.** *Carex constanceana* near Highway 34.



The seven *Carex constanceana* plants occur in or within a foot of the drainage's main channel. The two plants north of the road grow in graminoid sod, on the north side of a patch of woody plants, adjacent to the channel. The rest grow in areas of mostly bare soil, in or adjacent to the channel. Two of them grow with *Carex athrostachya*.

Seeds were collected at this site. Specimens were collected by cutting shoots just above ground level, to leave the rhizome system undisturbed. One plant was divided to provide one potted plant. (The hole was backfilled with soil and then watered, to increase the probability that the wild plant would survive),

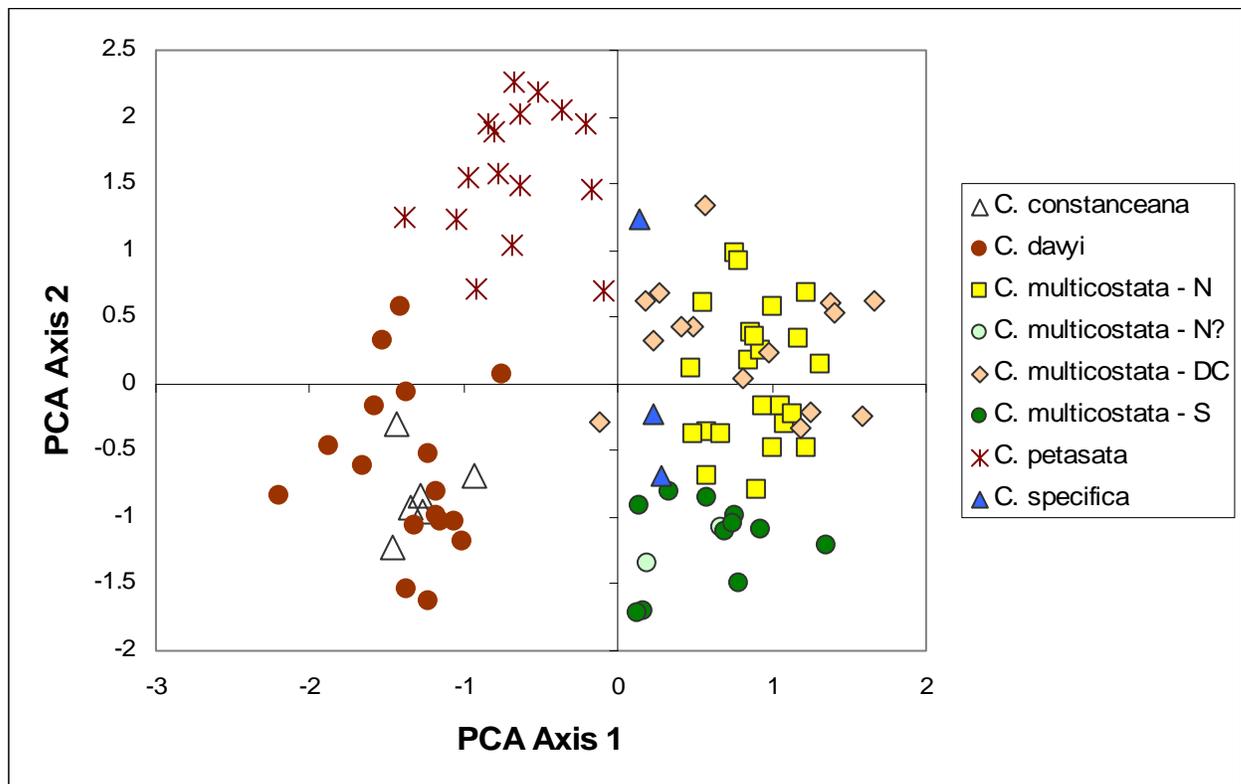
We surveyed more than 40 additional sites on nearby Forest Service and private land, and we were unable to find *C. constanceana* there (Table 6). In western Lake County, most large, flat to gently sloping areas (like the site where the *C. constanceana* grows) were homesteaded long ago and remain in private hands. Forest Service property near the *C. constanceana* site is mostly on steeper slopes and/or more heavily forested, and probably unsuitable for *C. constanceana*.

**Seed Germination and Transplant:** Although *Carex multcostata* germinated readily after three months of cold stratification, only three seedlings of *C. constanceana* were obtained. It is possible that perigynium removal or achene scarification would improve germination in this large-fruited, upland *Carex* (Wilson et al. 2008).

We transplanted part of one adult *C. constanceana* plant from the field into a gallon pot with standard potting soil. It is surviving in the greenhouse.

**Morphometric Analysis:** The first two axes of the Principal Components Analysis (Figure 7) explained 36% of the variation in the data set. Major traits on Axis 1 were perigynium length and length/width ratio (factor loadings of -0.853674 and -0.845592). Major traits on axis 2 were pistillate scale length and margin width (factor loading 0.7129 and 0.7134), achene length (0.6645), perigynium width (0.6095), and whether pistillate scales hid or revealed the perigynium beak (0.5924).

**Figure 7. Principal components analysis of *Carex constanceana*, *C. davyi*, *C. multicosata*, *C. petasata*, and *C. specifica*.** *C. multicosata*-N = northern plants = *C. pachycarpa*. Deep Creek plants (*C. multicosata*-DC) were apparently *C. multicosata* N but some (toward the left of their cluster in the PCA) have unusually long perigynia and, in many cases, unusually long inflorescences. Southern *C. multicosata* (*C. multicosata*-S) grow in the central and southern Sierra Nevada. *C. multicosata*-N? = plants with compact inflorescences, in the south end of the range of *C. multicosata*-N, growing at moderate elevations near sites where *C. multicosata*-S grows at higher elevations.



The 2008 Deep Creek plants with long perigynia are similar to *C. multicosata* but have longer inflorescences as well as longer perigynia. They differ in the direction of *C. petasata*, and we initially hypothesized that they might be hybrids. In the PCA, the individuals with longer perigynia occur at the left side of the *C. multicosata* cluster, near

the *C. petasata* cluster but also near the few *C. specifica* included in the analysis so far (Figure 7). These plants differ from *Carex specifica* mainly in perigynium texture. Perigynium texture was not one of the traits assessed for this study.

All the plants that have traditionally been called *C. multcostata* have a thick-textured perigynia surface due to broad bands of fiber associated with their vascular bundles. However, southern *C. multcostata* growing in the central and southern Sierra Nevada (perhaps south to San Bernardino County) have longer inflorescences than northern *C. multcostata*, which grows from the northern Sierra Nevada north into Washington and Montana. The PCA distinguished the southern plants from the northern ones (Figure 7). This result should be interpreted cautiously because only the most typical southern plants were included in analysis so far. Certain sedges from the north part of the range of the southern *C. multcostata* have short inflorescences like northern *C. multcostata* and grow at lower elevations, but cluster with northern *C. multcostata* in the PCA (Figure 7). Research into the identity of these plants is continuing.

The Kagan specimen of *C. constanceana* from Deep Creek, the *C. constanceana* isotypes from Mt. Adams, Washington, and the Dairy Creek *C. constanceana* are all similar to each other and to California *C. davyi* specimens (Figure 7). There seemed to be some slight differences between *C. davyi* of California and the *C. constanceana* of Oregon and Washington, so t-tests were used to test individual traits. Twenty-eight of the measured traits showed no significant differences (Table 7). There were significant differences in plant height (Californian *C. davyi* is taller) and in three measures of perigynium vein number (Table 7; Figure 11). In general, the northern plants have fewer perigynium veins, especially on the ventral surface which is often veinless, but there is overlap. Perigynium veins can be observed on some northern plants including *Suksdorf 3100* from Mt. Adams and the Kagan specimen, but usually no ventral veins (and no more than two ventral veins) extend into the beak. Although most California perigynia were more or less strongly veined on the ventral surface, a few (e.g. *Hipp 800*) are as veinless as northern plants. Overall, the differences between the Californian and the northern plants are tendencies, not the sharp differences one would like to see between species.

Certain traits that have been used to distinguish *C. constanceana* from *C. davyi* failed (Mastroggiuseppe 2002). Spike number and spike width overlap. In both taxa, pistillate scales near the base of the spike tended to be obtuse and those near the tip are acute.

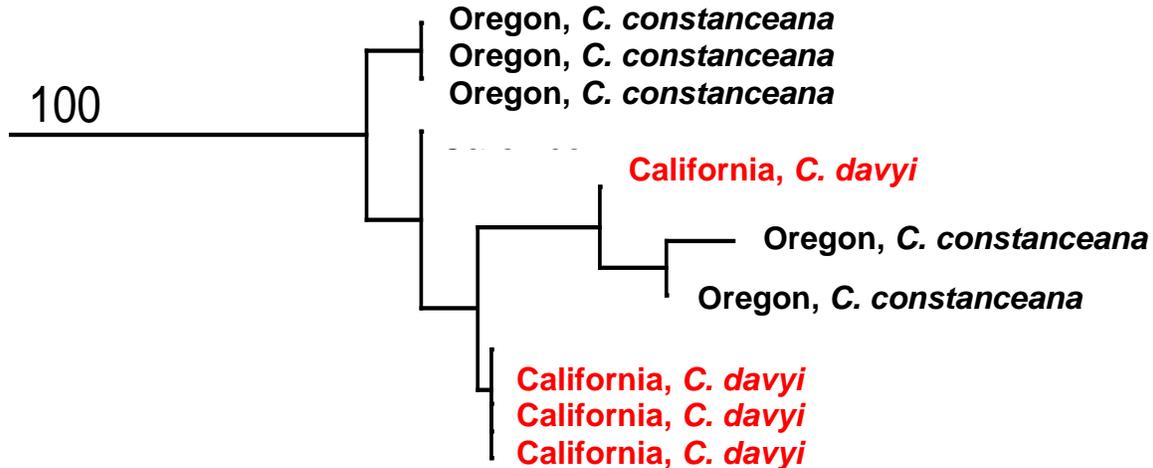
Despite the overlapping characters, Discriminant Analysis indicated that when all the morphological traits measured were used in the analysis, Washington and Oregon plants could be distinguished reliably from California plants (Table 3). This hints that there is some consistent difference between the California versus the Oregon plus Washington plants, when all the traits are considered together. However, our failure to find a trait that consistently differentiates these groups discourages one from recognizing them taxonomically.

**Table 3. Classification count table for specimens of *Carex constanceana* (from Oregon and Washington) and *C. davyi* (from California), in Discriminant Analysis.**

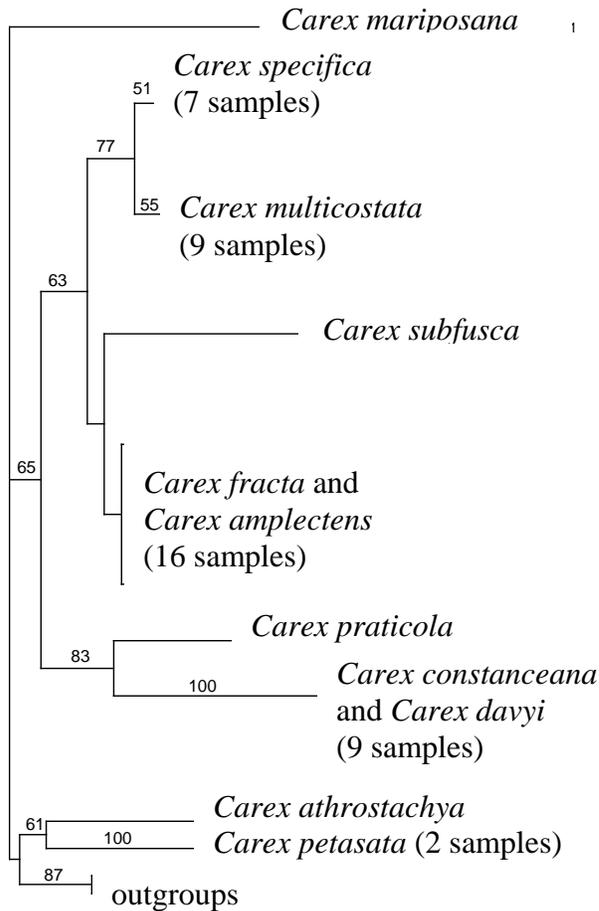
Predicted identification:	<i>C. constanceana</i>	<i>C. davyi</i>
Actual <i>C. constanceana</i>	6	0
Actual <i>C. davyi</i>	0	14

**DNA Sequences:** In a preliminary DNA phylogeny using mainly plants collected in 2008, the *C. constanceana* and *C. davyi* samples cluster together, supporting the hypothesis that they are the same taxon (Figure 8).

**Figure 8. Relationships among Oregon specimens of *C. constanceana* and California specimens of *C. davyi*, in the DNA phylogeny.** These plants all seem to be the same thing. This is a single cluster from a larger phylogeny (Figure 10).



The odd Deep Creek plants clustered with normal *C. multicosata* plants, but were separated from *C. petasata* (Figures 9 and 10). The hypothesis that the odd plants are hybrids of *C. multicosata* with either *C. constanceana* or *C. petasata* is not supported. It is plausible that they are simply odd *C. multicosata*. It is interesting that the *C. multicosata* samples tested, all of which are northern *C. multicosata* (= *C. pachycarpa*), form a cluster sister to the *C. specifica*, and the separation between these two clusters is not very constant (bootstrap values of 51 and 55). The relationship between these taxa needs further work.

**Figure 9. Summary of DNA phylogeny.** For details, see [Figure 10](#).**NOMENCLATURAL ISSUES**

***C. constanceana* and *C. davyi*:** Both morphological analysis and DNA sequence analysis indicate that *Carex constanceana* and *C. davyi* are the same species, despite a tendency for the northern plants to be a bit shorter and have fewer perigynium veins. The name *C. davyi* was published first, so it should be used for all these specimens.

It is possible that *C. constanceana* should be recognized as a subspecies of *C. davyi*, but evidence for doing so is not compelling at this time. If more *C. constanceana* can be found in Oregon or Washington, an analysis with larger sample sizes could clarify this issue.

***Carex multicosata*:** We found unexpected confusion surrounding the name *Carex multicosata*. The most relevant issue for Oregon is that (according to our best understanding at this point), the plants we have long known as *C. multicosata* should be called *Carex pachycarpa* Mackenzie.

The *C. multicosata* confusion is extensive. First, at any given herbarium, 10 – 30% of specimens labeled *C. multicosata* are actually other, more distantly related species.

After clearing up that problem, we find that the name *C. multcostata* has been applied to two groups of plants (Table 4). The name *C. pachycarpa* is available for the northern plants. Southern plants look quite different, but have a superficial similarity to *C. specifica*, especially the *C. specifica* specimens in the southern part of that species' range. Ranges of *C. pachycarpa* and southern *C. multcostata* overlap in the north part of the central Sierra Nevada, and when they do, the *C. multcostata* lives at higher elevation (Table 5).

**Table 4. Taxa involved in the *Carex multcostata* confusion.**

Traits	<i>C. multcostata</i> - N	<i>C. multcostata</i> - S	<i>C. specifica</i>
Nomenclature note	= <i>C. pachycarpa</i>	(perhaps nameless once types are examined)	(northern one probably stable, but are southern ones the same thing?)
Range	northern part of the central Sierra Nevada of CA, north to WA and MT	central and southern Sierra Nevada, CA	San Bernardino to Siskiyou Counties, CA
Elevation in CA	mostly 5000 – 9000 ft	8000 – 12000 ft	5000 - 10500
Inflorescence shape	short ovoid head	elongate head	elongate head
Inflorescence color	pale, tan and green	brown and tan	green and brown
Perigynium shape	ovate	ovate	lanceolate (north) to ovate (south)
Perigynium texture	thick	thick	thin
Perigynium veins	impressed or merged	impressed or merged	raised

**Table 5. Elevation on labels of California specimens of *C. multcostata* and *C. specifica*.**

The northern form can be called *C. pachycarpa*. These data are preliminary; some specimens of doubtful identification have been omitted, all identifications must be checked because the rate of misidentification among these species is high, and elevations of many more specimens is not written on the label but can be determined.

Elevation	northern form ( <i>C. pachycarpa</i> )	southern form ( <i>C. multcostata</i> )	<i>C. specifica</i>
3000 – 3999 ft.	1	-	-
4000 – 4999 ft.	1	-	2
5000 – 5999 ft.	13	-	4
6000 – 6999 ft.	21	-	6
7000 – 7999 ft.	17	1+	17
8000 – 8999 ft.	4	8	13
9000 – 9999 ft.	4	15	10
10000 – 10999 ft.	1	19	2
11000 – 11999 ft.	-	5	1

Names follow the identity of type specimens. We have seen an isotype of *C. pachycarpa*, and it is the species we have been calling *C. multicosata* in Oregon. We have seen some isosyntypes of the other relevant names and have requested loans of the other relevant types. We have not yet seen the type of *C. multicosata*, but it was collected near Bear Valley Dam in San Bernardino County, California, further south and at a lower elevation (approximately 6000 feet) than any southern *C. multicosata* we have seen. We wonder if the *C. multicosata* type specimen may be an example of southern *C. specifica*, which has also been collected at the Bear Valley site. If that proves to be true, the name *C. multicosata* will be a later synonym of *C. specifica*, and the southern plants that have been called *C. multicosata* will be nameless. In another potential twist, it is possible that southern *C. specifica* with ovate perigynia should be segregated from northern *C. specifica* with lanceolate perigynia. If the two were considered separate at the species level, the plants we now call southern *C. specifica* might have to be called *C. multicosata* (and southern *C. multicosata* would still be nameless). One's mind whirls.

## CONCLUSIONS

1. *Carex constanceana* is conspecific with Californian *C. davyi*; all the Washington, Oregon, and California plants should be called *C. davyi*.
2. *Carex constanceana* / *davyi* was found on private property near the Fremont-Winema National Forest in western Lake County.
3. The Kagan specimen from Deep Creek is *C. constanceana* - *davyi*. The Deep Creek population should be sought again, concentrating on one limited habitat type within the drainage.
4. Plants we have called *C. multcostata* should be called *C. pachycarpa*.
5. It is possible, though unlikely, that the Deep Creek plants with long perigynia collected in 2008 are *C. specifica*; comparison should continue. If so, they represent the first collection of this Californian plant in Oregon.
6. Classification of California sedges in *Carex* section *Ovales* (including *C. multcostata*, *C. specifica*, and *C. pachycarpa*) is a mess.

## RECOMMENDATIONS

1. *Carex constanceana* / *davyi* should be sought in Deep Creek, in the limited area of appropriate habitat.
2. *Carex constanceana* / *davyi* should be sought in the Gearhart Wilderness and surrounding areas, and also in suitable habitat in northern California and in the Cascades.
3. *Carex davyi* appears to be an extremely rare plant in Oregon and moderately rare in California. Attempts should be made to protect existing populations and establish new ones, if suitable habitat can be found. Perhaps establishing a cultivated population is appropriate.
4. Three months of cold stratification resulted in only limited seed germination of *C. davyi*. Another attempt to germinate the seeds should be made. Perhaps removal of the perigynium or scarification of the achene would help with these relatively large achenes.

## Other Interesting *Carex*.

During field work for this study, other interesting *Carex* were located on Forest Service property in the North Warner Mountains, including *Carex cordillerana* and *C. vernacula*, both on ORNHIC List 2.

***Carex cordillerana*.** Steeper portions of the north-facing slope on Deep Creek were home to two subpopulations of *C. cordillerana*. Most were in a densely forested area east of the intersection of roads 3915 and 4015. This site had a great deal of coarse woody debris. There was little other ground cover except some *C. multcostata*. About 20 plants were growing above a seepy area, in partial shade with *Trisetum* at UTM zone 10 734183 east, 4661466 north, +/- 59 feet, at 6055 feet elevation.

***Carex heteroneura*.** This montane species was collected on August 5 just south of Willow Point (UTM zone 10 729428 east, 4661869 north, 7400 feet elevation) in rocky openings in a mixed conifer forest. On August 7, one plant was also located below Road 3372 near Wagon Wheel Flat, about 3.6 road miles north of the intersection with road 34, at UTM zone 10, 680556 east, 4709554 north, 6678 feet elevation, at the edge of a large sagebrush-dominated opening near an aspen grove and mixed conifer forest.

***Carex pachystachya*.** Although this species is very common in western and northern Oregon (Wilson et al. 2008), it was not previously documented from southcentral or southeastern Oregon. It was found in the Deep Creek drainage and in northwestern Lake County.

***Carex raynoldsii*.** In most of its Pacific Northwest range, *C. raynoldsii* has orange-brown perigynia, but in the North Warners the perigynia matured light gray and looked very odd.

***Carex vernacula*.** A small population of this species survives below a snow bank on the unnamed peak with fire lookout west of Light Peak, 12.5 air miles northeast of Lakeview. Approximately 40 clumps were found at UTM zone 10 734218 east, 4687315 north, 7950 feet elevation. *Carex straminiformis* was also found at this site.

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**Table 6. Sites visited in search of *Carex constanceana*, in Lake County, Oregon, during 2008.** Map datum = WGS84; UTM zone = 10. Acc = accuracy. Accuracy and Elevation in feet. Observers: MA = Missy Anderson, LH = Lucille Housely, SM = Sarah Malaby, BN = Bruce Newhouse, NO = Nick Otting, BLW = Barbara L. Wilson. CARCON = *C. constanceana*, CARMUL = *C. multicosata*, CARPET = *C. petasata*.

Location	UTM e	UTM n	Acc.	Elev.	Date	Observers	CARCON	CARMUL	CARPET
Deep Creek, low			49	5734	8-Jul	NO, BLW		x	x
Deep Creek Campground			30	4891	8-Jul	NO, BLW		x	
Jct FS Road 3015 & Willow Cr.			56	6027	8-Jul	NO, BLW			x
Hwy 140 at dirt road north			13	5124	9-Jul	NO, BLW			
Deep Cr, Rd 4015-019, mile 0.9			13	5919	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 1.1			20	5977	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 1.6			30	6111	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 2.2			24	6000	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 2.4			20	6274	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 3.1			33	6408	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 3.1+			20	6590	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 3.7			39	6777	10-Jul	NO, BLW		x	
Deep Cr, Rd 4015-019, mile 4.0			26	6987	10-Jul	NO, BLW		x	
Creek with spur road 3915-022			33	5995	11-Jul	NO, BLW		x	
Polander (?) Creek			13	5970	11-Jul	NO, BLW		x	
Marster Spring Campground			36	4812	4-Aug	BN, NO, BLW			
FS Rd 34 at Deadhorse Creek			13	5945	4-Aug	BN, NO, BLW			
FS Rd 34, <i>C. constanceana</i> site			26	6065	4-Aug	BN, NO, BLW	x		
Dairy Creek crossing			46	5778	4-Aug	BN, NO, BLW			
Mud Creek Forest Camp			39	6495	5-Aug	BLW, LH		x	
Road 3615 below Mud Creek			36	6557	5-Aug	BLW, LH		x	
Road 017 ridgetop			16	6260	6-Aug	BLW, LH		x	
Road 017 aspen grove			49	6338	6-Aug	BLW, LH		x	
Road 3915 S of Rogger Meadow			23	6262	6-Aug	BLW, LH			
Willow Creek Campground				6155	6-Aug	BLW, LH		x	
near Willow Creek Campground			43	6155	6-Aug	BLW, LH		x	
Low on Willow Creek			59	6113	6-Aug	BLW, LH		x	

Location	UTM e	UTM n	Acc.	Elev.	Date	Observers	CARCON	CARMUL	CARPET
Road 3915-028, stop 1			62	6031	6-Aug	BLW, LH		x	
Road -015, site 2			10	5853	6-Aug	BLW, LH		x	
Road -015, site 3			20	5945	6-Aug	BLW, LH		x	
Road 3910			59	6121	6-Aug	BLW, LH			
Impoundment			5	6550	6-Aug	BN, NO			
Road 3615 forest			3	6700	6-Aug	BN		x	
Porcupine Creek			3	6500	6-Aug	BN		x	
Drake Peak, west slope			3	8000	6-Aug	BN			
Drake Peak, north slope			3	8300	6-Aug	BN			
Ridge near Light Peak			4	7950	6-Aug	BN			
Site 3360-1			26	5849	7-Aug	BN, NO, BLW			
Wagon Wheel			16	6678	7-Aug	BN, BLW		x	
Below Wagon Wheel			33	6506	7-Aug	BN, BLW		x	
Clear Spring			30	5374	7-Aug	BN, BLW			
Road 012 at road 135			43	5914	7-Aug	BN, BLW			
Road 102 at road 142			26	5973	7-Aug	BN, BLW			
Road 012, stop 3			33	5861	7-Aug	BN, BLW			
Road 012, stop 4			30	5835	7-Aug	BN, BLW			
Road 012, stop 5			33	5782	7-Aug	BN, BLW			
Deadhorse Rim Trail			9	6100	7-Aug	NO, MA			
Road 3428 culvert site			12	5800	7-Aug	NO, MA			
Plateau site			15	5750	7-Aug	NO, MA			
Campground site			9	5300	7-Aug	NO, MA			
Deadhorse Creek Forest Camp			30	5397	7-Aug	BN, NO, BLW			
Along Road 28			46	5618	7-Aug	BN, NO, BLW			
Spur 100 of Rd 3780; site 1			3 m	5850	7-Aug	BN, NO, BLW			
Spur 100 of Rd 3780; site 2			6 m	5965	7-Aug	BN, NO, BLW			
Spur 134 of FS Rd 3780			20	6069	8-Aug	BN, NO, BLW			
Spur 128 of FS Rd 3780			23	6117	8-Aug	BN, NO, BLW			
Spur 030 of FS Rd 3780 (#C)			23	5087	8-Aug	BN, NO, BLW			
Spur 030 of FS Rd 3780 (#D)			46	6010	8-Aug	BN, NO, BLW			
Spur 030 of FS Rd 3780 (#E)			49	5925	8-Aug	BN, NO, BLW			
Spur 030 near Thomas Cr. Rd.			49	5576	8-Aug	BN, NO, BLW			
Hwy 34 west of Dairy Cr.			30	5919	8-Aug	BN, BLW			
Spur 011 of FS Rd 34			52	6134	8-Aug	BN, BLW			

Location	UTM e	UTM n	Acc.	Elev.	Date	Observers	CARCON	CARMUL	CARPET
Rd 3372 in T35S R17E S31			23	5927	8-Aug	BN, NO, BLW		x	
Jct FS Rds 23 & 3411			33	6855	8-Aug	BN, NO, BLW		x	
Government Harvey Pass			36	7080	8-Aug	BN, NO, BLW			
Road 34, mile 11			12	5040	11-Aug	NO			
Road 34, mile 17			18	5725	12-Aug	NO, SM			
Dead Horse Creek north of mile 20 (A)			15	6175	12-Aug	NO, SM		x	
Dead Horse Creek north of mile 20 (B)			12	6150	12-Aug	NO, SM			
Spur 110 of Road 34 (#A)			12	6450	12-Aug	NO, SM			
Spur 110 of Road 34 (#B)			12	6440	12-Aug	NO, SM			
Spur 110 of Road 34 (#C)			15	6350	12-Aug	NO, SM			
Spur 110 of Road 34 (#D)			15	6225	12-Aug	NO, SM			
Spur 089 of Road 34			18	6025	12-Aug	NO			
Road 3372 near Dairy Creek			12	6475	12-Aug	NO		x	
Spur 212 of Road 3372			15	6400	13-Aug	NO		x	
Dairy Creek			12	6250	13-Aug	NO		x	
Dairy Creek, south-facing slope			16	6350	13-Aug	NO			
Dairy Creek, upstream			15	6350	13-Aug	NO			

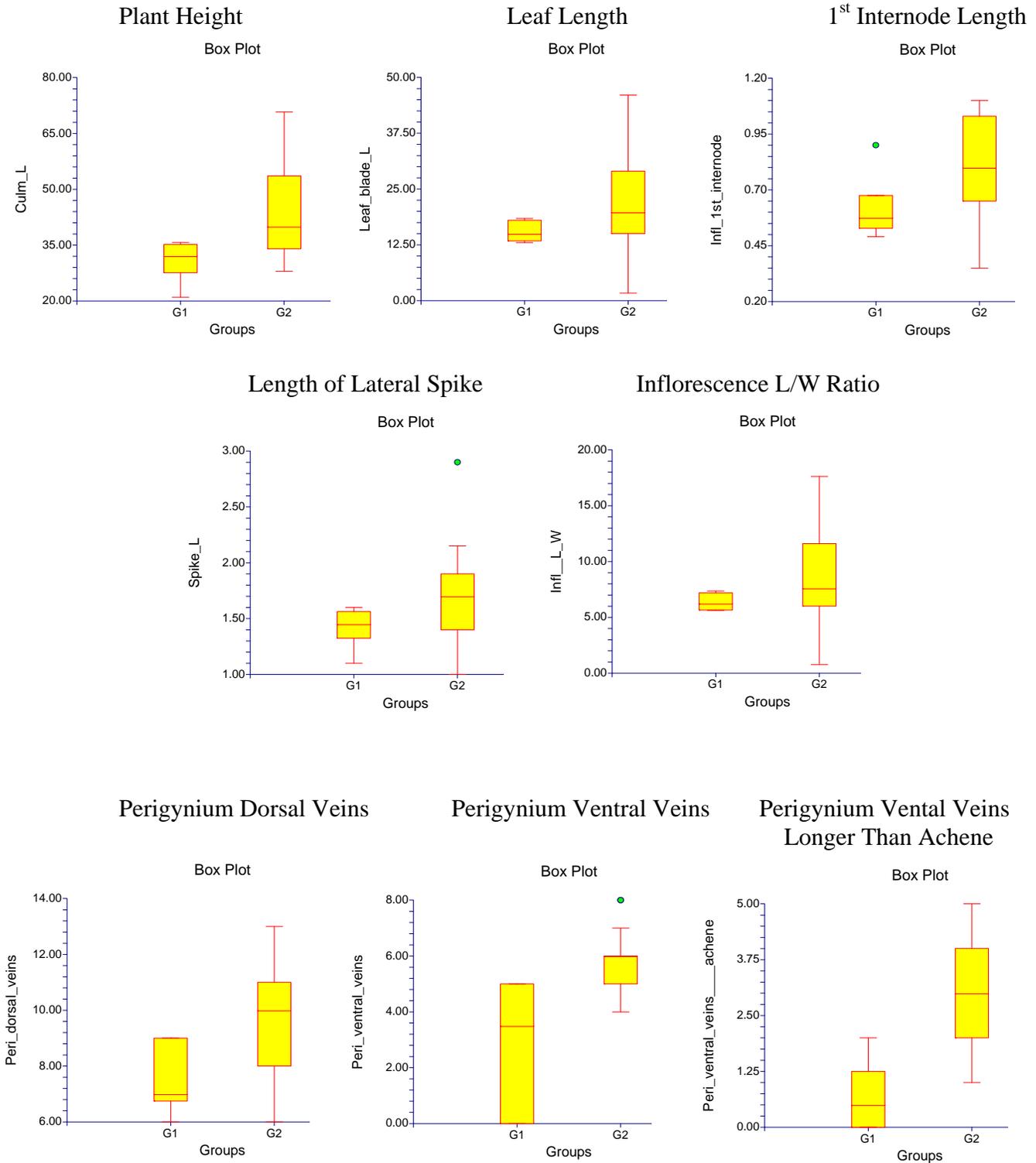
Table 7. Morphological traits used in study of *Carex constanceana* and allies. T-values, Z values, and probabilities calculated by comparing 15 California specimens of *C. davyi* with 6 Oregon and Washington specimens of *C. constanceana*. Whether variances were equal in the two sets determined whether equal variance T-tests or Aspin-Welch Unequal-Variance Test was used. Z-values and associated probabilities come from Wilcoxon Rank-Sum Test for Difference in Medians, and are presented when distribution of values is significantly non-normal. Note that when this many traits are compared, a few are expected to turn out “significantly different” (probability less than 0.05) just by chance. All traits except perigynium thickness were used in Principal Components Analysis.

Trait	Details	T-value	Probability	Variance	Z value	Probability
Plant height	cm	-2.0902	<b>0.0503</b>	equal		
Distal ligule, length	mm	0.4039	0.6908	equal		
Leaf blade, length	cm	-2.2509	0.3083	not equal		
Leaf blade, width	mm	-1.0832	0.2954	not equal		
Inflorescence, length	cm	-1.0558	0.3043	equal		
Inflorescence, width	cm	1.0172	0.3218	equal		
Infl. 1 <sup>st</sup> internode, length	cm	-1.8999	0.0727	equal		
Infl. 2 <sup>nd</sup> internode, length	cm	0.5651	0.5785	equal	0.5553	0.5787
Infl. – number of spikes	count	0.8604	0.4003	equal		
Lateral spike, length	cm	-1.6060	0.1248	equal	-1.9192	0.0550
Lateral spike width	cm	0.3654	0.7188	equal		
Staminate scale hyaline margin	mm	-0.8795	0.3901	equal		
Pistillate scale length	mm	-1.1032	0.2837	equal	-1.4151	0.1570
Pistillate scale hyaline margin	mm	0.5763	0.5712	equal		
Perigynium: dorsal veins	count	-2.5935	<b>0.0178</b>	equal		
Perigynium: ventral veins	count	-2.7312	<b>0.0342</b>	not equal		
Perigynium: vent. veins > achene	count	-3.8876	<b>0.0010</b>	equal		
Perigynium length	mm	0.6692	0.5115	not equal		
Perigynium width	mm	0.4869	0.6319	equal		
Perigynium thickness	mm	-0.5039	0.6201	equal		
Perigynium wing width	mm	-0.6454	0.5264	equal		
Perigynium: beak tip entire	mm	-0.1912	0.8504	equal		
Perigynium beak tip to ach. top	mm	1.1824	0.2535	not equal		
Achene, length	mm	0.0047	0.9963	equal		
Achene, length (no style stub)	mm	0.2031	0.8412	equal	-0.1192	0.9051
Achene, width	mm	1.1123	0.2799	equal		
Style stub length	mm	-0.3647	0.7193	equal		
Perigynium dorsal suture color	white/brown	-0.5994	0.5560	equal	-0.9713	0.3314
Relative length, scale & perigynium	subequal/short	-----	-----	equal		
Inflorescence length/width ratio	calculated	-0.9650	0.0672	not equal		
Spike length/width ratio	calculated	-1.5233	0.1441	equal	-1.3628	0.1729
Perigynium length/width ratio	calculated	-0.2243	0.8249	equal		
Achene length/width ratio	calculated	-1.0104	0.3250	equal	-1.4416	0.1494
Peri wing width / peri width ratio	calculated	-0.0253	0.9801	equal		
Beak length / peri length ratio	calculated	0.8677	0.3954	equal	0.9802	0.3270

**Figure 10. Carex phylogeny based on DNA sequences, from Andrew Hipp and Jaime Weber, unpublished data.**

**NOTE:** Figure 10 has been removed from this online version of the report at the request of the authors. If this information is needed, please contact the authors to request the full report.

**Figure 11. Graphs of means and ranges of morphological traits used to compare *Carex constanceana* (G1) and *C. davyi* (G2), for traits with probabilities less than 0.1. Horizontal bar in each box is the mean.**



## Appendix 1: Specimens Examined

### Sources of Specimens:

BH – L. H. Bailey Hortorium Herbarium, Cornell University, Ithaca, New York  
 CAS – California Academy of Sciences, San Francisco, California  
 CWG – *Carex* Working Group specimens, not accessioned  
 DS – Dudley Herbarium, at CAS  
 GH – Herbaria, Harvard University, Cambridge, Massachusetts  
 JEPS – Jepson Herbarium, at UC  
 MICH – Herbarium, University of Michigan, Ann Arbor, Michigan  
 NY – William and Lynda Steere Herbarium, New York Botanical Garden, Bronx, New York  
 ORE – Herbarium, University of Oregon, at OSC  
 OSC – Herbarium, Oregon State University, Corvallis, Oregon  
 RSA – Herbarium, Rancho Santa Ana Botanic Garden, Claremont, California  
 UC – University Herbarium, University of California, Berkeley, California  
 WILLU – Morton E. Peck Herbarium, Willamette University, at OSC  
 WS – Marion Ownbey Herbarium, Washington State University, Pullman, Washington  
 WTU – Herbarium, Burke Museum of Natural History and Culture, University of Washington, Seattle, Washington

### Specimens Examined:

\* = used in Principal Components Analysis of morphological traits

Species other than *C. constanceana*, *C. davyi*, *C. petasata*, *C. praticola*, *C. multicostata*, and *C. specifica* are included because those specimens were misidentified as one of those six taxa.

***Carex abrupta*: California: Mono Co.:** Slate Creek Basin, east of Mount Conness, Harvey Monroe Hall Natural area. Below cabin rock near meadow., 23 July 1935, *Clausen 1144* (DS); **Tuolumne Co.:** Tuolumne Meadows, 12 August 1938, *J.T. Howell 14558* (CAS).

***Carex constanceana* (now considered to be *C. davyi*): Oregon: Lake Co.:** Road 34, a couple hundred feet west of mile post 20, 4.8 miles by road west of Road 28, T35S R17E S32, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 4 August 2008, *Wilson 15063* (OSC\*); Fremont National Forest; Forest Service Road 2515, T39S R16E S29, 20 June 1996, *Kagan s.n.* (OSC\*); **Washington: Co.:** Mount Paddo, 17 August 1898, *Suksdorf 3100* (WS\*); Woden Valley, Mt. Paddo, 16 August 1909, *Suksdorf 6864* (CAS,DS,MICH,NY,WTU\*).

***Carex crawfordii*: Alaska: Co.:** ca. 4 miles west of Fairbanks, ca. 0.5 mile north of 2.0 Mile Old Nenana Highway, 5 July 1982, *Baldwin 367* (DAV).

***Carex davyi*: California: Alpine Co.:** Hill above Ebbert's Pass, 1864, *Brewer 2724* (GH); Mokelumne Wilderness and adjacent Toiyabe Nat'l Forest. On the saddle immediately east of Winnemucca Lake, T R S , xx°xx' north, xxx°xx' west, 17 July 1999, *Hipp 901* (MICH\*); Mokelumne Wilderness and adjacent Toiyabe Nat'l Forest. On the saddle immediately east of Winnemucca Lake, T R S , xx°xx' north, xxx°xx' west, 17 July 1999, *Hipp 901a* (MICH); Hermit Valley, slope south of the Mokelumne River, 26 July 1935, *Peirson 11714* (CAS,RSA\*); Woods Lake Region, shores of Winnemucca Lake, 24 July 1937, *Peirson 12203* (CAS,RSA\*); Winnemucca Lake, 3 mi. S . Of Kit Carson Pass, 21 July 1944, *Rose 44195* (CAS); Winnemucca Lake, 3 mi. S of Kit Carson Pass, 21 July 1944, *Rose 44196* (MICH); **Eldorado Co.:** above Slippery Ford, 13 July 1897, *E. Brainerd s.n.* (UC\*); northeastws of Gilmore Lake, 31 August 1946, *J.T. Howell 22954* (CAS,MICH,RSA\*); **Nevada Co.:** City of Truckee; Sagehen Research Area, Tahoe Nat'l Forest, Truckee Ranger District. Along road leading through Sagehen Campground, T18N R16E S6 , xx°xx' north, xxx°xx' west, 14 July 1999, *Hipp 800*

(MICH\*); Tahoe National Forest; Ridge bet. Catfish & French Lakes, 8 June 1926, *Smith 1899* (CAS); Sagehen Experimental Forest, below campground road (FS road 11-4), c. 0.5 miles NW of Sagehen Campground; ca. 3 air km SE of outlet of Independence Lake, N of Sagehen Hills, T R S , xx°xx' north, xxx°xx' west, 20 July 2008, *Zika 23921* (WTU\*); **Sierra Co.:** Little Truckee River near outlet of Webber Lake, 13 September 1969, *J.T. Howell 46104* (CAS); **Sierra Co.:** ca. 12 mi SSE of Sierraville, N of Truckee, along Forest Service Road 11, 0.9 mi W of junction of Road 11 and route 89, 0.2 mi E of junction of Road 11 and road to Independence Lake, T R S , xx°xx'x" north, xxx°xx'xx" west, UTM zone east, north, WGS 84, 4 August 2006, *Naczi 11433* (MICH\*); **Sierra Co.:** Sagehen Experimental Forest, above culvert on Forest Service Road 260, 1.05 road miles W of Route 89 on the signed (4 mi) road to Sagehen Campground, T R S , xx°xx' north, xxx°xx' west, 18 July 2008, *Zika 23919* (OSC,WTU\*); **Sierra Co.:** Sagehen Experimental Forest; 50 - 150 m S of Forest Service Road 260, 4 air km WSW of Stampede Reservoir, 0.3 road miles from junction with road 11, T R S , 39°26.7' north, xxx°xx7' west, 20 July 2008, *Zika 23920* (WTU\*); **Tuolumne Co.:** Tuolumne Meadows, 11 August 1944, *J.T. Howell 20317* (CAS,MICH,RSA,UC\*); Mono Pass, 16 August 1944, *J.T. Howell 20620* (CAS,GH,RSA,UC\*); **(no county):** Big Trees, 1896, *Hillebrand 2322* (UC\*); **Co.:** Sierra Nevada, 1850, *Hillebrand 1860-67* (MICH); **Co.:** State Survey 2728 (UC).

**Carex densa: California: Humboldt Co.:** Gans Prairie (on ridge E of Orick), 29 May 1936, *Tracy 14826b* (JEPS).

**Carex foena: South Dakota: Co.:** 30 miles west of Hill City, 4 July 1943, *Brenckle 43082* (UC).

**Carex fracta: California: Riverside Co.:** San Jacinto Mts. Summit of San Jacinto Peak, 5 August 1932, *Wolf 3983* (DS); San Jacinto Mts., *Hasse s.n.* (DS);

**Carex gracilior: California: Humboldt Co.:** on Bald Mountain, 5 July 1925, *Tracy 7166* (JEPS); Gans Prairie (on ridge E of Orick), 29 May 1936, *Tracy 14826a* (JEPS);

**Carex haydeniana: California: Tulare Co.:** Black Rock Pass, Great Western Divide, 4 September 1962, *Bedell 77-2* (CAS);

**Carex integra: Canada, Yukon Territory: Co.:** Lake Tahoe Basin; West Fork Incline Creek, UTM zone 11 xxxxxx east, xxxxxx north, 17 August 1999, *Murrell 785* (DAV);

**Carex mariposana: California: Riverside Co.:** between Dollar Lake and South Fork Meadows, San Bernardino, 11 August 1957, *Raven 11160* (CAS); San Jacinto Mts., along trail from Tahquitz Valley to San Jacinto Peak, 5 August 1932, *Wolf 3947* (DS).

**Carex microptera: California: Inyo Co.:** Big Pine Lakes; Third to Fifth Lake, 8 August 1947, *J.T. Howell 23907* (CAS); **Mono Co.:** Slate Creek Basin, east of Mount Conness, Harvey Monroe Hall Natural area. Below cabin rock near meadow., 23 July 1935, *Clausen 1144* (DS); **Tuolumne Co.:** 1 mi. W. of Sonora Pass summit, 23 July 1939, *Wiggins 9274* (DS); **Nevada: Clark Co.:** Big Falls, 14 July 1935, *Clokey 7035* (CAS); **Utah: Salt Lake Co.:** Bells Canyon, area near reservoir, 20 July 1959, *Cottam 15826* (DS); **Washington: (no county):** Mount Adams, August 1882, *T.J. Howell 338* (OSC).

**Carex multcostata: California: Alpine Co.:** Carson Pass, 28 July 1935, *Peirson 13599* (CAS); **Eldorado Co.:** on ridge south and above Lake Schmidell, Desolation Valley Wilderness Area, 29 July 1944, *Robbins 1801* (CAS); **Fresno Co.:** Mt. Goddard, 0 July 1900, *Hall 693* (CAS); **Mono Co.:** Leavitt Creek drainage, between Leavitt Creek and rd. to Leavitt Lake; Toiyabe National Forest, 13 July 1978, *Genz 8202* (CAS); **Nevada Co.:** Hobart Mills, along railroad, 29 May 1916, *Wagener x* (CAS); **(no county):** Sierra National Forest, 20 September 1912, *Hatton H-128* (CAS); **Nevada: Elko Co.:** along road to Wells, 2.2 miles east of Angel Lake, East Humboldt Mountains, 25 June 1958, *Raven s.n.* (CAS); **Nevada: Washoe Co.:** Carson Range, S end of Big Meadows, T18N R18E S15 S 1/2 SW 1/4, 28 July 1978, *Genz 8665* (CAS); **Washoe Co.:** Marlette Lake, July 1903, *Hall 4584* (CAS).

**Carex cf. multcostata – DC (now considered to be C. pachycarpa): Oregon: Lake Co.:** first unnamed (did we), UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 11 July 2008, *Otting 1970* (CWG\*); Deep Creek, 0.7 mile upstream from Forest Service road 3915 on Forest Service road 4015-019, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 24 July 2008, *Wilson 15010, 15011, 15013, 15014, 15015* (CWG\*); Deep Creek, along road 4015, ¼ mile or less upstream (+/- west) of Forest Service road 3915, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 10 July 2008, *Wilson 15018* (CWG\*); Deep Creek, along road 4015, ¼ mile or less upstream (+/- west) of Forest Service road 3915, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 24 July 2008, *Wilson 15017, 15025, 15027, 15029, 15030, 15036* (CWG\*); near and south of Forest Service Road 3915, near the 15 mile marker, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 24 July 2008, *Wilson 15044* (CWG\*); near and south of Forest Service Road 3915, between the 15 mile marker near UTM zone 10, xxxxxx east, xxxxxx north (WS84) and spur 024, the first road junction west of that marker, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 24 July 2008, *Wilson 15043* (CWG\*).

*Carex multcostata* – N (now considered to be *C. pachycarpa*): **California: Alpine Co.:** near Sliver Valley, July 1863, *Brewer 1977* (CAS); Dry hills at Ebbets Pass, 1 August 1863, *Brewer 1986* (CAS); Woods Lake Region, along creek east of Woods Lake, 26 July 1937, *Peirson 12206* (CAS); Woods Lake, Sierra Nevada, 22 July 1937, *Peirson 13563* (CAS); **Eldorado Co.:** Upper Echo Lake, 18 July 1946, V & A. *Grant 7724* (CAS); Mt. Tallac, 31 August 1946, *J.T. Howell 22943* (CAS,DS); Eldorado National Forest; by intermittent drainage to Lyons Crk., T11N R16E S8 SE 1/4, 25 July 1987, *Tallent 812* (CAS); Desolation Wilderness area; Crest Trail ca. 1/4 mile east of Tamarack Lake spur., T12N R17E S34 SE 1/4 of NW 1/4, 6 August 1987, *Tallent 882* (CAS); **Glenn Co.:** West from Plaskett Ranger Station on old road ca. 1/2 mile, 11 July 1942, *M.S. Baker 10321* (CAS); Plaskett Meadows, 3 August 1943, *J.T. Howell 18972* (CAS); Black Butte, 10 August 1943, *J.T. Howell 19271* (CAS); ridgeline running NNE of the summit of Black Butte ca. 1/4 miles NNE of summit, 10 July 1982, *Jokerst 1606* (CAS); **Humboldt Co.:** South Fork Mountain near Blake Lookout, 0 July 1930, *Tracy 9039* (CAS); Trinity Summit, at corral prairie, 11 July 1932, *Tracy 10411* (CAS\*); **Lake Co.:** slopes just below summit of Sheehiron Mountain, 13 July 1954, *Bacigalupi 4676* (CAS); **Lassen Co.:** ca. 4 miles SSE Bogard Ranger Station, Lassen National Forest, 26 June 1964, *Crampton 7076* (CAS); **Modoc Co.:** naer inlet creek, N side of Cave Lake, Warner Mts., T48N R15E S36 SW 1/4, 21 July 1996, *Zika 12942* (OSC\*); Warner Mountains, T48N R15E S36 NE 1/4 or SE 1/4, 7 August 1997, *Zika 13275* (OSC\*); Warner Moutains, Modoc National Forest, T47N R15E S11 NE 1/4 or NW 1/4, 9 August 1997, *Zika 13294* (OSC\*); near Little Lily Lake, 4.5 air miles SE of town of New Pine Creek, Warner Mountains, Modoc National Forest, T47N R15E S11 NE 1/4 of SW 1/4, 9 August 1997, *Zika 13297* (OSC\*); **Nevada Co.:** Donner Lake, 14 June 1900, *Dudley s.n.* (DS\*); west side of Donner Pass near Norden, 16 July 1943, *J.T. Howell 18424* (CAS); Willow Valley just west of Castle Peak, 18 July 1943, *J.T. Howell 18511* (CAS); dirt road to Castle Pk. Ca. 2.0 mi. n. of Hwy #80 at Boreal Ridge, 28 July 1980, *McNeal 2382* (OSC\*); east end of Donner Lake, 14 June 1958, *Raven 13217* (CAS); 3.5 miles north of Cisco Grove on Rattlesnake Creek, 23 July 1964, Sierra Nevada. Vicinity of Donner Pass, about 80 miles northeast of Sacramento., 0 July 1956, *Thomas 6215* (DS); *True 1620* (CAS); just west of Truckee near Donner State Park, 30 June 1965, *True 2149* (CAS); Uhlen Valley on upper Castle Creek, 0.3 mile north of Hiway 80 and 1.5 mile north of Norden, 15 September 1965, *True 2607* (CAS); Boreal Drdige, about 8 miles west of Truckee and just east of summit, 23 June 1966, *True 2958* (CAS); Castle Pass about 3 miles north of Norden, at head of Castle Valley, 20 July 1966, *True 3061* (CAS); Euer Valley on south fork of Prosser Creek, 2.5 miles north of Donner Lake, 21 July 1966, *True 3088* (CAS); Sagehen Creek Wildlife and Fisheries Station of the University of Califonria, *True 3961* (CAS); north shore of Meadow Lake, 19 August 1967, *True 4069* (CAS); Magonigal Camp c. 8 mi. NE of Cisco Grove and ca. 1.5 mi. E of Lake Fordyce, 12 August 1970, *True 6300* (CAS); White Rock Lake ca. 1 mile southwest of Mt. Lola, 24 August 1970, *True 6390* (CAS); White Rock Lake ca. 1 mile southwest of Mt. Lola, 24 August 1971, *True 6924* and *6925* (CAS); ca. 1/2 mile west of Donner Lake, 31 May 1974, *True 7755* (CAS); west of Independence Lake, 26 July 1977, *True 8397* (CAS); Alder Creek about 4.5 mi. north west of Truckee and just south of Prosser Hill, 5 August 1965, *True 2423A* (CAS); **Placer Co.:** Donner Pass to Mt. Lincoln, 21 July 1943, *J.T. Howell 18641* (CAS); Ward Creek, 26 August 1970, *Neilson 1827* (CAS); Vicinity of Donner Pass, about 80 miles northeast of Sacramento., T R S , xx°xx' north, xx°xx' west, 0 July 1956, *Thomas 6173* (DS); **Plumas Co.:** McRae Meadow, 27 June 1951, *J.T. Howell 27593* (CAS); Boiling Springs Lake to Krakesbad, 20 July 1960, *J.T. Howell 35732* (CAS); Mt. Ingalls Quad; about 100 ft west of Paradise Cr and about 1/3 mi south of Little Grizzly Cr., T24N R12E S20 NW 1/4, 2 July 1990, *Janeway 3749* (CAS); Crocker Mt. Quad, south side of Dotta Canyon 2.2 mi southeast of Beckwourth-Genesee Road, T24N R14E S26 SW 1/4, 27 May 1992, *Janeway 4205* (CAS); Frazier Falls area, 16 July 1980, *J. Jones 214* (CAS); near Pratville, Lake Almanor, 0 August 1944, *Kearney 25* (CAS); 1/4 mile southeast of Boiling Springs Lake, 3 July 1954, *Leschke s.n.* (CAS); **Shasta Co.:** Lassen's Peak, 26 September 1863, *Brewer 2178* (CAS); Lassen Volcanic National Park; Lassen Loop north of Diamond Peak, 23 August 1960, *J.T. Howell 36453* (CAS,OSC); **Siskiyou Co.:** meadow at Twin Valley, Ssikyous Mts., just east of Del Norte County line; 4 air-line miles NNE of Preston Peak; watershed of Indian Creek, 10 July 1959, *Bacigalupi 7303* (CAS); Medine Lake, 28 July 1921, *Eastwood 10942* (CAS); Josephine Lake basin, 22 June 1966, *Ferlatte 115* (CAS); Big Flat, near South Fork of Salmon River; campground, T39N R9W S18 NE 1/4, 41° north, 123° west, 14 July 1974, *Ferlatte 1524* (CAS); South Fork of Salmon River near Big Flat, 21 July 1937, *J.T. Howell 13199* (CAS); **Siskiyou Co.:** South Fork of Salmon River near Big Flat, 22 July 1937, *J.T. Howell 13254* (CAS); Caribou Basin, Salmon-Trinity Alps., 24 July 1937, *J.T. Howell 13429* (CAS); Caribou Gulch, 26 July 1937, *J.T. Howell 13557* (CAS); Spirit Lake, Marble Mts., 2 August 1939, *J.T. Howell 14908* (CAS); Elk Mt., Marble Mts., 6 August 1939, *J.T. Howell 15108* (CAS); Sky High Valley, Marble Mts., 9 August 1939, *J.T. Howell 15219* (CAS); Ridge south of Marble Valley, Marble Mts., 9 August 1939, *J.T. Howell 15231* (CAS); Caribou Meadow, 26 July 1937, *J.T. Howell 13557A* (CAS); Black Mt., Marble Mts., 8 August 1939, *J.T. Howell 15149A* (CAS); along Mud Creek, Mount Shasta, 14 July 1961, *Major 644A* (CAS); S. slpe of Mt. Shasta, *Rose 37593* (CAS); Klamath National Forest; Forest Rd 39N11 at Little Jackson Creek, T39N R9W S16 NE 1/4 of SW 1/4, xx°xx' north, xxx°xx'xx' west, 13 August 1987, *Tallent 915* (CAS); Klamath Naitonal Forest: Bear Ground Bl., T48N R9W S32 (MDM), 6 August 1934, *Wheeler 3049* (CAS); **Trinity Co.:** basin near Blck Rock Lake, North Yolla Bolly Mts., 20 July 1951, *Munz 16721* (CAS); Trinity Alps Wilderness; near small pond across ridge NW of Landers Lake, 15 August 1987, *Tallent 934* (CAS); Devil's Canyon Mts. At head of White's Creek, 6 August 1935, *Tracy 14581* (CAS); South Fork Mountain near Cold Springs, 2 July 1942, *Tracy 17383* (CAS); Shasta-Trinity National Forest; Deadfall Creek Meadow, 1.3 miles south of Parks Creek Summit on Forest Service Road 17, T40S R6W S14, 12 July 2001, *Wilson 10574* (ORE\*); **Co.:** Lake Tahoe region, 27 August 1943, *Alexander & Kellogg 3489* (CAS); **Co.:** Mount Shasta, 13 September 1862, *Brewer 1398* (CAS); Trinity Alps: Upper Bowerman Meadows below Lake Anna, T35N R9W S3 NE 1/4, 41° north, 123°

west, 25 August 1975, *Ferlatte 1735* (CAS); **(no county)**: Summit Camp, 20 June 1870, *Kellogg s.n.* (BH (2 sheets)); Sierra Nevada, *Kellogg s.n.* (GH (2 sheets)); **Co.**: Trinity-Tehema County Line. North slope of North Yolla Bolly Peak, 18 July 1951, *Munz 16669* (CAS); **Co.**: Minaret Summit on boundary between Madera and Mono Counties, near summit of the Knob, 19 July 1934, *Peirson 11268* (CAS); **Idaho: Idaho Co.**: Oro Grande Summit Camp, northeast of Buffalo Hump, Nez Perce National Forest, 13 August 1954, *W.H. Baker 12475* (CAS); **Owyhee Co.**: along lower Sawpit Creek, ca. 1 mile south of Silver City, 27 July 1951, *W.H. Baker 8240* (CAS); **Nevada: Elko Co.**: East Hujmboldt Range southwest of Wells, ridge between Angle Lake and Greys Peak, T36N R61E S4, 22 August 1986, *Tiehm 10926* (CAS,ORE); **Washoe Co.**: Big Meadows on U.S. Forest Service road from Verdi to Hunter Lake, north end of the Carson Range, 27 July 1978, *J.T. Howell 53236* (CAS); **Oregon: Baker Co.**: Near Lakes Ranger Station, Elkhorn Mountains 17 mi. W of North Powder, 19 August 1915, *Peck 3414* (WILLU); **Baker Co.**: Rock Creek Lake, Elkhorn Mountains, 17 mi. W of Haines, 13 August 1915, *Peck 3415* (WILLU); Slope of Wallowa Mountains, 6 mi. NE of Cornucopia, 30 August 1915, *Peck 3416* (WILLU); **Crook Co.**: near summit of Lookout Mt.; Ochoco Mts. East of Prineville, T14S R20E S30, 14 July 1953, *Cronquist 7484* (CAS); **Deschutes Co.**: Soda Meadow., T18S R8E S1 SE 1/4 OF SW 1/4, 15 July 1947, *Ireland 2673* (ORE); **Douglas Co.**: Diamond Lake., 13 July 1936, *Peck 19292* (WILLU); **Grant Co.**: Strawberry Mountain, Blue Mountains., 30 July 1925, *Henderson 5584* (CAS,ORE\*); Strawberry Mountains, 2 mi. S of Strawberry Lake, 15 July 1921, *Peck 10223* (WILLU); High Lake Trailhead, ridgeline, Strawberry Mountain Wilderness, Malheur National Forest, T15S R33E S12, 14 August 1995, *Zika 12586* (OSC\*); **Harney Co.**: Banks of stream above Fish Lake, Steens Mountains., 20 July 1927, *Henderson 8631* (CAS,ORE); Steens Mountains, near Fish Lake, 20 July 1927, *Henderson 8633* (CAS,ORE\*); Fish Lake, Steens Mountain., 10 July 1927, *Lawrence 4290* (CAS,ORE\*); Steens Mountain, above (E of) Little Wildhorse Lake., T33S R33S S35 SW 1/4, 30 July 1992, *Mansfield 92-192* (OSC); above Fish Lake, Steens Mts., 16 July 1935, *Thompson 12157* (CAS); ca. 0.5 mi S of Steens Mt. Loop Rd.; Burns BLM; tributary to Donner & Blitzen River; dry meadow 20 feet from N bank of Corral Cr., T32S R32.75E S33 SW 1/4 of SE 1/4, 3 July 1991, *Zika 11236* (OSC\*); **Jackson Co.**: Siskiyou Mountains, ca. 15 airmiles SW of Ashland; ridge of Jackson Gap above road; above headwaters of Silver Fork., T41S R2W S12 NE 1/4, 29 June 1986, *Ertter 6483* (ORE\*); Alpine slopes of Ashland Peak, Siskiyou Mountains., 28 July 1935, *Thompson 12342* (CAS,WILLU); Mt Ashland, slope NW of the summit, T40S R1E S17 SE 1/4, 6 August 1993, *Wilson 6314* (OSC\*); **Josephine Co.**: Lake Mountain Trail, Oregon Caves National Monument, 15 July 1937, *Applegate 11248* (CAS,DS); Sand Ridge, Lake Mountain Trail, 23 July 1949, *W.H. Baker 471* (CAS); meadow at Upper Biglow Lake, 18 July 1950, *W.H. Baker 887* (CAS); Siskiyou National Forest; on highway 4045, 1.8 m [miles] NW of intersection of 4045 and 3941 or ca. 25 m [miles] E of Cave Junction, 23 June 1973, *Denton 2616* (OSC); near the top of Grayback Mountain., 13 July 1930, *Henderson 13389* (ORE\*); above Cave Lake [Bigelow Lake], 3 mi. SE of Oregon Caves, 16 July 1918, *Peck 8284* (WILLU); near Bolan Lake., 20 July 1945, *Peck 23854* (WILLU); near Bolan Lake., 20 July 1945, *Peck 23863* (WILLU); Borders of Bolan Lake, Siskiyou Mountains., 5 August 1935, *Thompson 12487* (WILLU); **Klamath Co.**: Rim 1/2 mi west of lodge, Crater Lake National Park, 0 August 1922, *Abrams 9796* (DS); Rim near the lodge, Crater lake National Park, 4 September 1927, *Abrams 12093* (DS); Crater Lake National Park; Munson Meadow just below the Park headquarters, 15 August 1950, *W.H. Baker 7215* (CAS); Crater Lake south rim, 6 July 1928, *Kildale 5561* (CAS); S rim of Crater Lake., 30 August 1916, *Peck 3385* (WILLU); S. rim of Crater Lake., 30 August 1916, *Peck 3386* (WILLU); S rim of Crater Lake., 30 August 1916, *Peck 3387* (WILLU); Fort Klamath., 16 July 1920, *Peck 9542* (WILLU); 2 mi. NW of Ft. Klamath, 5 July 1937, *Peck 19714* (WILLU); flat 2 mi NW of Fort Klamath, 5 July 1939, *Peck 19714* (CAS); Crater Lake, E of Government Camp, 14 August 1925, *Thompson s.n.* (WILLU); about Government Camp, Crater Lake Park., 21 August 1923, *Wynd 1409* (ORE); Crater Lake Park, 11 August 1929, *Wynd 1650* (ORE); Crater Lake National Park; behind headquarters building., T31S R6E S8 SE 1/4, 22 August 1994, *Zika 7519* (OSC); Junction of Rim Drive & Pinnacles Road, Kerr Notch, E slope of Cascade Mountains., T31S R6E S1, 28 August 1995, *Zika 12691* (OSC); Rim Drive at Rim Village, headwaters of Dutton Creek, ca. 50m NW of Dutton Creek trailhead, W slope of the Cascade Mts., Crater Lake National Park, T31S R6E S5 SW 1/4, 31 August 1995, *Zika 12716* (OSC); 10 meters below Rim Drive, below Applegate Peak, E slope of the Cascade Mountains, Crater Lake National Park., T31S R6E S10 SE 1/4, 1 September 1995, *Zika 12726* (OSC\*); Lagoons SSE of Mazama Campground, E slope Cascade Mountains, Crater Lake National Park, T31S R6E S30, 25 September 1995, *Zika 12795* (OSC); **Lake Co.**: Dry slope, Abert Rim, N of Lakeview, 5 July 1936, *R.C. Andrews 491* (ORE\*); Willow Creek Forestry Camp, Warner Mountains., 24 June 1973, *Munz 18366* (OSC\*); Slopes of Crane Mountain near Lakeview, 11 July 1936, *Thompson 13209* (CAS,WILLU); North Warner Mountains; along road that goes northwest from the last intersection before Willow Creek Campground, UTM zone 10 xxxxxx east, xxxxxxx north, WGS84, 6 August 2008, *Wilson 15126* (CWG\*); **Linn Co.**: Santiam NF, Duffy Lake., 13 September 1916, *Flory 21* (OSC); **Malheur Co.**: below Larribeau Reservoir on headwaters of W. Little Owyhee, near Hoppin Springs at headwaters of W. Little Owyhee R. about 15 miles northeast of McDermitt, NV., 8 July 2005, *Nielsen, H. 1105* (OSC); **Wallowa Co.**: On Hurwal rocks; near Polaris Trail; Wallowa Mts., S of Enterprise., T4S R45E S31, 3 September 1975, *Cole 227A* (ORE\*); Aneroid Lake, above Wallowa Lake, 20 July 1936, *Rose 36524* (CAS); above Aneroid Lake, Wallowa Mts., 22 July 1936, *Rose 36594* (CAS); along trail, E Fork Wallowa River; Wallowa Mts., T4S R45E S28 NW 1/4 of NE 1/4, 26 September 1991, *Zika 11416* (OSC); **(no county)**: Crater Lake, 1918, *Evermann s.n.* (CAS); Mt. Hood; [mountain]., 24 July 1884, *Henderson s.n.* (ORE); **Washington: Kittitas Co.**: Alpine slopes on Table Mt., Wenatchee Mts., 1 July 1940, *Thompson 14877* (CAS); **(no county)**: Mt. Paddo, 26 September 1893, *Suksdorf 2604* (CAS\*).

**Carex multcostata (southern form): Fresno Co.:** Mono Rock, 20 July 1946, *J.T. Howell* 22557 (CAS); Pioneer Basin, 22 July 1946, *J.T. Howell* 22650 (CAS,DS); Mono Creek Canyon, 22 July 1946, *J.T. Howell* 22675 (CAS); Granite Basin, 6 August 1946, *Leschke s.n.* (CAS); North Goddard Creek, 18 July 1952, *Raven* 4432 (CAS); Colby Meadows, 29 July 1952, *Raven* 4741 (CAS); Mills Creek, 14 July 1953, *Raven* 5671 (CAS); Second Recess, 18 July 1953, *Raven* 5715 (CAS); along Mono Creek near intersection of Hopkins Creek, 27 July 1953, *Raven* 5922 (CAS); Trail below Lake Italy, 3 August 1954, *Raven* 7743 (CAS); Bench Lake, 23 July 1956, *Raven* 9783 (CAS); Vicinity of Mono Pass, Pioneer Basin, 4th Recess, and adjacent Mono Creek. Between lowest lake in Pioneer Basin and Mono Creek. North of xx degrees xx minutes north; east of xx degrees xx minutes west., 2 September 1957, *Thomas* 6880 (DS); ca. 71 km NE of Fresno (FSC), Sierra National Forest, a few meters W of the Dinkey Lakes boundary, along the Dinkey Lake trail, T9S R26E S11 NE 1/4 of SE 1/4, xx°x'xx" north, xxx°x'xx" west, 20 July 1996, *York* 1278 (CAS); **Inyo Co.:** Mosquito Flat, Rock Creek Lake Basin, 14 July 1946, *J.T. Howell* 22317 (CAS); **Inyo Co.:** Fifth Lake, Big Pine Lakes Basin, 4 August 1947, *J.T. Howell* 23715 (CAS); Seventh Lake, Big Pine Lakes, 9 August 1947, *J.T. Howell* 23952 (CAS); Mosquito Flat Campground, Rock Creek Road to Rock Creek Lake Basin, 12 August 1981, *J.T. Howell* 54529 (CAS); No. Blue Lake, above Lake Sabrina, 9 August 1950, *Raven* 272 (CAS); Trail above Whitney Portals, 31 July 1954, *Raven* 7652 (CAS); **Madera Co.:** near Garnet Lake, 30 July 1941, *J.T. Howell* 16506 (CAS); Agnew Pass Trail, 31 July 1941, *J.T. Howell* 16565 (CAS); Shadow Creek blow Lake Ediza, 6 August 1941, *J.T. Howell* 16789 (CAS); near Isberg Lake, 12 August 1958, *J.T. Howell* 34359 (CAS); Two Teats, 14 July 1951, *Raven* 3467 (CAS); Shadow Creek blow Lake Ediza, 22 July 1951, *Raven* 3554 (CAS); Dike Creek, 5 August 1951, *Raven* 3769 (CAS); Lake Adiza, 19 July 1935, *Rose* 35389 (CAS); **Mariposa Co.:** May Lake, 11 August 1938, *Bracelin* 895 (CAS); Snow Flat, 13 August 1938, *J.T. Howell* 14575 (CAS\*); **Mono Co.:** Leavitt Creek drainage, between Leavitt Creek and rd. to Leavitt Lake; Toiyabe National Forest, T5N R22E S7 SW 1/4, 13 July 1978, *Genz* 8206 (CAS); Virginia Lakes, 1 July 1957, *Hardham* 2425 (CAS); Mt. Conness Region: Steelhead Lake, 11 September 1959, *Twisselmann* 5686 (CAS); **Riverside Co.:** Summit of San Jacinto Mt., 11 July 1908, *Reed* 2488 (DS); **Tulare Co.:** Southern end of Sand Meadow between Hockett and South Fork Meadows, Sequoia National Park, 24 July 1943, *Ferris* 10864 (CAS,DS\*); East Lake, 3 August 1940, *J.T. Howell* 15951 (CAS); Sky Parlor Meadow, Chagoopa Plateau, 1 August 1942, *J.T. Howell* 17544 (CAS); Sky Parlor Meadow, Chagoopa Plateau, 1 August 1942, *J.T. Howell* 17546 (CAS\*); Rock Creek, 19 July 1949, *J.T. Howell* 25520 (CAS); Rock Creek, 24 July 1949, *J.T. Howell* 25671 (CAS); (Mineral King & Vicinity) White Chief Trail, 17 July 1951, *J.T. Howell* 27843 (CAS); (Mineral King and vicinity) White Chief Trail, 17 July 1951, *J.T. Howell* 27846 (DS); White Chief Trail, 17 July 1951, *J.T. Howell* 27848 (CAS); (Mineral King & Vicinity) Farewell Gap Grail, 20 July 1951, *J.T. Howell* 27992 (CAS); (Mineral King & Vicinity) White Chief region, 21 July 1951, *J.T. Howell* 28074 (CAS); 4.5 miles north of Blackrock Guard Station on Monache Jeep Trail, 9 August 1967, *J.T. Howell* 43671 (CAS); Cherry Hill Road just south of Big Meadow, 26 June 1970, *J.T. Howell* 46892 (CAS); Foot of Colby Pass on Kern-Kaweah River, 28 July 1936, *McCracken s.n.* (CAS); Wallace Lake, Sequoia National Park, 1 September 1959, *Morton* 11865 (CAS\*); Kern Plateau; west side of Sherman Peak, 3/8 mile from the summit, 17 July 1968, *Twisselmann* 14660 (CAS); Kern Plateau; west side of Sherman Peak, 3/8 mile from the summit, 17 July 1968, *Twisselmann* 14661 (CAS); Kern Plateau; meadow at the head of Kern Peak Stringer, 28 July 1970, *Twisselmann* 17220 (CAS); **Tuolumne Co.:** upper end of Emigrant Lake, 3 August 1940, *Hoover s.n.* (CAS); Lambert Dome, Tuolumne Meadows, 11 August 1944, *J.T. Howell* 20333 (CAS); between Tioga Pass and Gaylor Lakes, 12 August 1944, *J.T. Howell* 20344 (CAS); between Dry Lake and Tuolumne Meadows, 13 August 1944, *J.T. Howell* 20438 (CAS); between Young Lake and Tuolumne Meadows, 15 August 1944, *J.T. Howell* 20508 (CAS); Mono Pass Trail, 16 August 1944, *J.T. Howell* 20599 (CAS\*); Tuolumne Canyon above Geln Arbor, 14 August 1944, *J.T. Howell* 30497 (CAS); Yosemite Research Reserve about 1 mile south-southeast of Siesta Lake, T1S R1E S22, 12 August 1978, *Powell s.n.* (CAS).

**Carex multcostata N in S: California: Tuolumne Co.:** Dardanelle, 25 June 1944, *Alexander & Kellogg* 3770 (CAS,DS\*); Eagle Meadow, 17 July 1941, *Hoover* 5496 (CAS\*);

**Carex pachystachya or C. subbracteata: California: Del Norte Co.:** Rowdy Creek, 3 miles E of Smith River Village, 25 June 1938, *Parks & Tracy* 11479 (CAS); **Humboldt Co.:** Buck Mt., lower NW slopes, 16 June 1935, *Parks & Tracy* 11271 (CAS); Iagna, 4 July 1927, *Tracy* 8233 (CAS); Valley of South Yager Creek, 24 June 1928, *Tracy* 8465 (CAS); Bannan Mountain, 10 July 1930, *Tracy* 8868 (DS); Dobbyn Creek, 25 May 1935, *Tracy* 13885 (DS); Bald Mt., one mile north of Murphy Meadows., 9 July 1939, *Tracy* 16316 (DS); **Tulare Co.:** Chagoopa Plateau, 1 August 1942, *J.T. Howell* 17563 (CAS); **Oregon: Josephine Co.:** near Grants Pass, 24 May 1884, *T. Howell s.n.* (CAS).

**Carex pachystachya: California: Mono Co.:** Trail from Green Lake to West Lake, 28 June 1957, *Hardham* 2403 (CAS); **Washington: Pierce Co.:** Voss, 8 July 1948, *Galbreath* 241 (OSC).

**Carex petasata: Arizona: Coconino Co.:** near Kaibab Lodge at entrance to North Rim of Grand Canyon National Park, 27 July 1940, *Ferris* 10233 (DS); **California: Alpine Co.:** 0.5 mile west of Monitor Pass, 10 July 1963, *J.T. Howell* 39731 (CAS); **Lassen Co.:** Lassen NF, Patterson Flat, T33N R7E S18, 12 July 1933, *Fischer & Johnson* F235 (UC\*); Burgess Spring experimental Range, Halls Falt Quadrangle, T33N R9E S19, 28 June 1939, *Gardner* G-32 (UC\*); Burgess Spring experimental Range, Halls Falt Quadrangle, T33N R9E S23, 18 June 1937, *Gardner* G-6 (UC); High Cascade Range: Halls Flat; about 0.3 km east of Road 33N13, 3.5 km north of junction of Road 33N18., 25 June 2004, *Janeway* 8139 (JEPS,CHCS); High Cascade Range. Halls Flat; about 0.3 km east of Road 33N13 3.5 km north of junction of Road

33N18., T33N R6E S15 NE 1/4, xx<sup>0</sup>xx'xx" north, xx<sup>0</sup>xx'xx" west, 26 June 2004, *Janeway 8139* (); High Cascade Range. About 1.3 km west-southwest of Patterson Flat, at junction of Roads 35N08 and 34N20, in Blacks Mountain Experimental Forest., T33N R7E S10 SW 1/4, xx<sup>0</sup>xx'xx" north, xxx<sup>0</sup>xx'xx" west, 26 June 2004, *Janeway 8158* (CHCS); High Cascade Range. 0.6 km east-southeast of Patterson Flat along Road 33N71; Blacks Mountain Experimental Forest, T33N R7E S12 NW 1/4, xx<sup>0</sup>xx'xx" north, xxx<sup>0</sup>x'xx" west, 26 June 2004, *Janeway 8164* (CHCS); approx. 0.6 air mi. WSW of Schoonamaker Lake, UTM zone 10 xxxxxx east, xxxxxx north, , 23 June 2004, *Lenz 221* (CHCS); **Mono Co.:** Cabin Creek, margin of Chiatovich Flats, near the highest elevation grove of Lodgepole Pines in the waterwhet., 31 July 1982, *Taylor 8075* (UC); **Colorado: Boulder Co.:** Lake Eldara, 22 July 1918, *Clokey 3223* (CAS); Three kilometers east of Allenspark. Rense property, T3N R72W S31, 21 July 1971, *Fritts 71-15* (CAS); Mesa Trail, east base of Green Mt., SW of Boulder, 1 July 1962, *Weber 11490* (DS); **Gilpin Co.:** Tolland, 15 July 1920, *Clokey 3677* (CAS); **Gunnison Co.:** along road east of Jack's Cabin, 7 July 1970, *Breedlove 17531* (CAS); **Jefferson Co.:** Cool Crek Canon, 18 June 1920, *Clokey 3678* (CAS); **Larimer Co.:** Longs Peak Inn, 27 June 1939, *Rose 39351* (CAS); **Idaho: Butte Co.:** above headwaters of North Fork, Little Cottonwood Creek. Craters of the Moon National Monument, 29 June 1956, *W.H. Baker 14209* (CAS); **Cassia Co.:** Cache Peak Range (Albion Mountains), Silen City of Rocks, near the summit of road, 13 airline miles southeast of Oakley, 13 June 1972, *Holmgren 5879* (CAS); **Custer Co.:** mid-way between Stanley Lake and Cape Horn, 7 July 1944, *Hitchcock 9658* (CAS,DS,UC); **Kootenai Co.:** 1890, *Leiberg 292* (ORE); **Twin Falls Co.:** in canyon of Shoshone Creek south of Magic Hot Springs, 6 July 1949, *Christ 18442* (CAS); **Valley Co.:** west of Cascade, Payette Nat. For., 15 July 1937, *Thompson 13858* (CAS); **Idaho: Co.:** Challis National Forest; Soldier Mt., 21 June 1922, *Long & Woods 1128* (OSC); (**no county**): Beaver Canyon, June 1895, *Rydberg 2058* (CAS); **Montana: Adams Co.:** ca. 15 miles south of New Meadows on road to Weiser, 24 June 1946, *Hitchcock 13903* (DS,UC\*); **Gallatin Co.:** Spanish Basin, 23 June 1897, *Rydberg 3804* (UC); Wallrock Basin, 8 July 1921, *Suksdorf 339* (CAS,DS,UC\*); Jackrabbit Gulch, 12 July 1921, *Suksdorf 404* (CAS); **Lake Co.:** 2 miles south of Polson, 27 June 1948, *Hitchcock 17754* (CAS); **Lewis and Clark Co.:** Fifteen miles west [sic] of Lincoln, 1 July 1948, *Hitchcock 17882* (CAS); **Madison Co.:** East Hammond Creek, 13 miles east of Ennis, 23 July 1947, *Hitchcock 16747* (CAS); **Meagher Co.:** 5 miles northeast of Ringling, 1 July 1947, *Hitchcock s.n.* (CAS); **Montana: Powell Co.:** 1 mile east of Shaw Creek Ranger Station, 15 July 1948, *Hitchcock 18496* (CAS); **Sanders Co.:** near High Point [near Lake County Line], 23 June 1966, *Thomas 11752* (DS); Upper part of Elk Creek, 5 August 1967, *Thomas 13765* (DS); (**no county**): Mt. Sentinel, se Missoula, 31 May 1933, *Hitchcock 1631* (DS); Evaro, 13 July 1909, *M.E. Jones s.n.* (DS); near campus, Missoula, 28 May 1921, *Kirkwood 1031* (CAS,UC\*); Blackfoot Valley, Railey's Range, Monture Creek, 9 June 1923, *Kirkwood 1422* (CAS,DS,ORE); **Nevada: Elko Co.:** Golliher Pasture, 18 mi. NE San Jacinto, 8 July 1941, *Holmgren 1367* (UC\*); Pinon Range, unnamed creek on E side of the range, E of Raven's Nest, T30N R53E S10, UTM zone xxxxxx east, xxxxxx north, , 7 June 2003, *Tiehm 14264* (CAS,OSC); **Humboldt Co.:** Pine Forest Range, south end of Rodeo Flat, SW of Duffer Peak, T43N R28E S32, 28 June 1982, *Tiehm 7298* (CAS); **Nye Co.:** below old sawmill site, Pine Creek Canyon; Toquima Range, Toiyabe National Forest, 20 July 1945, *Maquire 25856* (CAS); Hot Creek Range, 1/4 mile WNW of Sixmile Summit between north and south Sixmile Canyons, T9N R50E S11, 5 July 2001, *Tiehm 13665* (OSC); Hot Creek Range, 1/4 mile WNW of Sixmile Summit between north and south Sixmile Canyons, 5 July 2001, *Tiehm 13665* (CAS); Hot Creek Range, 1/4 mile WNW of Sixmile Summit between north and south Sixmile Canyons, T9N R50E S11, 5 July 2001, *Tiehm 13665* (CAS,OSC,UC\*); **Washoe Co.:** Bald Mt., Peterson Canyon, 2 air miles south of Refuge sub-HQ, T45N R21E S16 SW 1/4, 30 June 1978, *Rogers 1109* (OSC); Mosquito Mountains, 1.0 road miles S of Crooks Lake Road on road to Mud Lake, T44N R19E S19, 13 June 2001, *Tiehm 13614* (CAS,OSC,UC\*); **New Mexico: Sierra Co.:** bordering Mimbres Lake, Black Mountains of Gila National Forest, T14S R10W S24 NE 1/4, 1 September 1974, *Shultz 1373* (OSC); **Oregon: Baker Co.:** Blue Mountains, foothills of Elkhorn Range, 6889 Green Ridge Drive; 2 air miles west of Baker City., T9S R40E S19, 15 June 2001, *Otting & Lytjen 444* (OSC); **Crook Co.:** Bear Butte, 20 June 1894, *Leiberg 332* (UC); **Crook Co.:** 20 mi. E. of Prineville, 15 June 1928, *Peck 15972* (CAS); Ochoco Ranger Station, Ochoco Forest., 21 June 1932, *Peck 17031* (WILLU); along Marks Creek, Ochoco Forest, 16 July 1938, *Peck 20125* (WILLU); Dry roadside, N of Kelly Gap. Ochoco Mountains, Ochoco National Forest, Forest Service Road 4235., T15S R20E S19 SE 1/4 of NE 1/4, 9 July 1992, *Zika 11742* (OSC); 10 mi. N of Seneca, 8 July 1941, *Peck 21041* (UC\*); Tributary to Little Bear Creek, Paulina Ranger District, Ochoco National Forest, T17S R26E S6 NE 1/4 of SW 1/4, 29 June 1993, *Streier 13* (OSC); **Harney Co.:** Steens Mountains region, 11 miles due east southeast of Frenchglen, T32S R32.75E S33, 14 July 1953, *Hansen 377* (CAS,OSC); 11 mi. due ESE of Frenchglen, 14 July 1953, *Hansen 377* (CAS); Steens Mountain; west rim of Kiger Gorge; 19 air miles southeast of Frenchglen., T32.5S R33E S36, 9 August 2001, *Otting 393* (OSC); near head of Emigrant Creek., 4 August 1912, *Peck 3390* (WILLU); top of Steens Mountains, 4 mi. S of head of Wild Horse Creek., 29 June 1925, *Peck 14096* (WILLU); 22 mi. N of Burns., 30 June 1941, *Peck 20976* (WILLU); Myrtle Park, NW corner of Harney County., 6 July 1941, *Peck 21016* (CAS,WILLU); 20 mi. NW of Burns., 7 July 1941, *Peck 21041* (WILLU); high W slope of Steens Mountains, below Fish Lake., 28 June 1942, *Peck 21448* (WILLU); Ochoco Mountains; Ochoco National Forest; Wickiup Creek watershed; Deadhorse Spring; along Road 500 about 2 miles northwest from Road 41, 8 June 1995, *Taylor 15054* (UC); Steens Mountain: Jackman Camp campground, 20 August 1983, *Taylor 8246B* (UC\*); **Lake Co.:** Fremont National Forest; Forest Service Road 3515., T29S R16E S29, 20 June 1996, *Kagan s.n.* (OSC); Forest Camp on Dairy Creek, 35 mi. NW of Lakeview, 1 July 1927, *Peck 15399* (WILLU); Forest Camp on Dairy Creek, 35 mi. NW of Lakeview, 1 July 1927, *Peck 15399* (DS,WILLU); Deep Creek, near mile post 15 on Forest Service road 3915, UTM zone 10 xxxxxx east, xxxxxx north, WGS84, 24 July 2008, *Wilson 15019* (CWG\*); Drew's Creek campground, 7 air miles E of Dog Mountain, E of crest of Barnes Rim., T40S R18E S10 NE 1/4 of NW 1/4, 21 July 1996, *Zika 12922* (OSC); **Malheur Co.:** in Rail Canyon of the N. Clover Creek drainage of

Bully Creek, at the confluence of a small tributary stream from the NE., T16S R38E S14 SW 1/4 of NW 1/4, 29 August 1998, *Mansfield 98-128* (OSC); Owyhee uplands, headwaters of the West Little Owyhee River, 1 mile east of Hoppin Springs, 11 air miles northeast of McDermitt., T40S R44E S22, 2 July 2003, *Otting 642* (OSC); **Union Co.:** 13 airline miles west-southwest of La Grande; between highway 224 and the Grande Ronde River 1/4 mile downstream from the confluence of Beaver Creek, T3S R36E S30 SW 1/4 of NE 1/4, 15 July 1995, *Lytjen 58* (OSC); **Wallowa Co.:** Downey Lake., 30 May 1983, *[unknown] s.n.* (OSC); T10S R23E S1 NWNE, T10S R23E S1 NE 1/4 of NW 1/4, 19 July 1995, *Halvorson 693* (OSC); **Wheeler Co.:** 7 mi. E of Mitchell., 9 July 1921, *Peck 10134* (DS,WILLU); Ochoco National Forest, on Forest Service Road 26-00-60., T12S R20E S28 NW 1/4, 11 July 1993, *Wilson 6173* (OSC); **(no county):** Bear Butte., 26 June 1894, *Leiberg 332* (ORE); *Cusick s.n.* (ORE); **Utah: Iron Co.:** Between Navajo Lake and Cedar Breaks, 25 September 1938, *Eastwood 7251* (CAS,UC); Between Navajo Lake and Cedar Breaks, 25 September 1938, *Eastwood 7251* (UC); **Millard Co.:** Herdouse area in Corn Creek, Pavant, 4 August 1953, *Lewis 210* (CAS); **San Juan Co.:** east base of the Abajo Mts., 5 miles west of Monticello, T33S R23E S31, 30 June 1961, *Cronquist 9392* (CAS); **Summit Co.:** ca. 30 mi E of Coalville, along E side of route 150 at its junction with Forest Service Road 120, T R S , xx°xx'xx" north, xxx°xx'xx" west, 6 August 2004, *Naczi 10737* (CHCS); **Wasatch Co.:** Lower Bench Creek (near Woodland), 2 July 1953, *Lewis 174* (CAS); **Utah: (no county):** Old Ranger Pasture, Little Valley., 3 July 1953, *Lewis 175* (CAS); Upper Daniels Canyon., 29 June 1953, *Lewis 180* (CAS); **Washington: Okanagan Co.:** near Whistler Camp, 7 July 1932, *Fiker 994* (DS); along Barnhard Trail west of Salmon Meadows, 17 July 1932, *Fiker 1042* (DS); COrmak Creek above Disautel, 4 July 1933, *Fiker 1299.5* (CAS); summit of Muckamuck Lookout, 26 June 1931, *Thompson 7004* (DS); **Spokane Co.:** near Spangle, 23 June 1884, *Suksdorf 1305* (CAS); Spangle, 24 July 1936, *Suksdorf 8916* (CAS); southwest of Spangle, 24 July 1916, *Suksdorf 8916* (CAS,UC\*); **Wyoming: Lincoln Co.:** Kemmever Coal Mine, 1 July 1982, *Carpenter 82-54* (UC\*); **(no county):** Treasure Mtn. Scout Camp, Teton Canyon, Targhee National Forest, 5 July 1956, *L.C. Anderson 426* (CAS,OSC,UC\*); Yellowstone National Park; Dunraven Peak, 27 August 1899, *Nelson 6725* (UC\*); Fremont-Hot Springs County Line: Owl Creek Range east of the Wind River Canyon, at Bird's Eye Pass, 0 June 1961, *Porter 8630* (DS); Yellowstone Lake, 1 July 1938, *Stevens 38-171* (DS).

**Carex petasata:** **Canada: Alberta: Co.:** Castlemount Ranger Station, 22 June 1925, *Malte 568* (UC\*); **British Columbia:** above Nicola Lake, at stand #6, T R S , 50° north, 120° west, 14 July 1972, *Beil 251* (OSC); About two miles east of town of Williams Lake, 2 June 1956, *Calder 16919* (OSC); Bull Canyon about 4.5 miles west of Alexis Creek, 12 June 1956, *Calder 17349* (OSC); Two miles west of Cascade on highway to Grand Forks, 29 May 1962, *Calder 32985* (OSC); Sparwood, 49 degrees 114 degrees NW Upper C, Plot 4, T R S , 49° north, 114° west, 14 July 1980, *Gould 80-179* (OSC); about 3 miles below Lytton (Junction of Fraser and Thompson Rivers), 19 April 1934, *McCabe 818* (UC); Vaseaux Lake, 5 May 1938, *McCabe 5881* (UC); One mile north of Flathead Customs on Flathead Road, 25 June 1958, *Taylor 2031* (OSC); **Yukon Territory:** Sunnydale area two miles south of West Dawson, 14 July 1949, *Calder 3688* (DS).

**Carex phaeocephala:** **Montana: Silverbow Co.:** Highland Mtns., Flattop Mt.n, 16 August 1959, *Bamberg 381* and *404* (DAV).

**Carex praegracilis:** **California: Modoc Co.:** west shore Middle Lake, near Cedarville, 10 May 1950, *Balls 14596* (RSA); below Menlo Baths, west shore lower Alkali Lake, 10 May 1950, *Balls 14603* (RSA).

**Carex praticola:** **Alaska: (no county):** Centr. Pacific Coast: Teikel, 6 July 1935, *J. P. Anderson 1927* (UC); **California: Del Norte Co.:** Crescent City, low flats 2 miles east of town, 25 May 1933, *Tracy 12390* (UC); **Humboldt Co.:** Eureka, 3 May 1914, *Tracy 4421* (UC); Eureka; wet ground at Stephan Hill Place, 6 June 1915, *Tracy 4641* (UC); Gans Prairie (on ridge E of Orick), 29 May 1936, *Tracy 14826* (UC); **Tuolumne Co.:** Yosemite National Park: Andrews Peak, south of Jack Main Meadows, 26 July 1938, *Mason s.n.* (UC); **Colorado: Boulder Co.:** Lake Eldara, 3 August 1918, *Clokey 3240* (UC); 20 July 1921, *Clokey 4031* (UC); **Gilpin Co.:** Tolland, 15 July 1920, *Clokey 3679* (UC); **(no county):** Eldara, 26 July 1918, *Clokey 3214* (UC); Twin Lakes, 9 July 1919, *Clokey 3379* (UC); Tolland, 19 July 1913, *Robbins 1021* (UC); **Montana: Lews and Clark Co.:** near Danaher Ranger Station; Flathead National Forest, 22 July 1948, *Hitchcock 18637* (UC); **(no county):** Midvale, 19 July 1903, *Umbach 435* (UC); **Oregon: Klamath Co.:** 8 mi. SW of Lake-of-the-Woods, 5 July 1931, *Peck 16686* (UC); **Wyoming: Albany Co.:** Laramie Peak, 10 July 1900, *Nelson 7513* (UC); **Sublette Co.:** Green River Lakes, northern Wind River Range, Trail along the west side of the lower lake., 29 July 1964, *Porter 9661* (UC); **Teton Co.:** Grassy Lake road west of the Flagg Ranch, 9 July 1959, *Porter 7876* (UC).

**Carex praticola:** **Canada: Alberta:** Gumfing(?) Pound Creek, 1 June 1887, *Macoun 25540* (UC); Jasper Park; Goat Mountain, 18 July 1918, *Macoun 98270* (UC); Jasper Park; Mts. North of Cavell Creek, 15 August 1917, *Macoun 98271* (UC); Wood Buffalo Park, Mackenzie Basin: Base of eastern slope of Caribou Mountains, T R S , xx°xx' north, xx°xx' west, 17 July 1930, *Raup 1906* (UC); **British Columbia:** Near Anahim Lake, T R S , xx°xx' north, xx°xx' west, 9 July 1956, *Calder 18573* (UC); **Manitoba:** 3.0 km E of Treherne, along N side of route 2, 3.0 km E of junction of routes 2 and d242 (to S), roadside rest area, T R S , xx°xx'xx" north, xx°xx'xx" west, 26 June 2003, *Naczi 9869* (CHCS); **Northwest Territories:** Mackenzie District . . . Fort Simpson . . . by R. C. Mission Farm Buildings, T R S , xx°xx' north, xxx°xx' west, 16 July 1955, *Cody 8832* (UC); Dawson, *MacLean s.n.* (UC); **Quebec:** Cairn Island . . . near the "Narrows", 29 July 1939, *Abbe 3490* (UC); **Yukon Territory: Co.:** about 8 miles north of Carcross on road to Whitehorse, T R S , xx°xx'

north, xxx°xx' west, 15 August 1960, *Calder 28309* (UC); Dawson: across Yukon Ferry, 18 June 1914, *Eastwood 296* (UC); Canol Rd.: mile 102. Rose-Lapie R. Pass . . . near headwaters of Lapie R., 19 July 1944, *Porsild 10601* (UC); Vicinity of campground, Rancheria, at mile 710, Alaska Highway, 29 June 1968, *Welsh 7537* (DAV).

**Carex praticola: Greenland: Co.:** Groenlandia meridionalis: Dyrnes, T R S , xx°xx' north, xx°x' west, 1 August 1963, *Hansen 241* (UC); Syd-Gronl. Qaqortog, ved Kirkeruinen, T R S , xx°xx' north, xxx°xx' west, 4 August 1925, *Porsild s.n.* (UC).

**Carex scoparia v. scoparia: California: Plumas Co.:** Snake Lake, about 4 miles northwest of Quincy, 15 July 1976, *J.T. Howell 51848* (CAS).

**Carex specifica: California: Alpine Co.:** by lake at Ebbett's Pass, 7 August , *Brewer 2079* (CAS); Carson Grade, 26 July 1936, *Cantelow s.n.* (CAS); **Alpine Co.:** Carson Grade, 26 July 1936, *Cantelow s.n.* (CAS); Hermit Valley . . . South of the Mokelumne River, 26 July 1935, *Peirson 11713* (CAS,GH); Twin Lakes Forest Service public campground, on north shore of Twin Lakes, 10 September 1956, *Robbins 3762* (CAS); Luther Pass, N end of Grass Lake, 5 August 1983, *Williams 83-130-2* (CAS); **Eldorado Co.:** Echo Lake, 11 July 1897, *E. Brainerd 188* (GH); Meisner's "Little Lake", 17 July 1897, *E. Brainerd 191* (GH); On Ice House Road, north side of Schreiber's Ice House Resort, 12 June 1964, *Frenkel 575* (CAS); Sierra Nevada, from Camp Cody, Boy Scouts of America, Cody Lake Basin, S. of Strawberry on the American River; Toiyabe National Forest, 30 July 1978, *Genz 8710* (CAS); Lake of the Woods, 29 September 1945, *J.T. Howell 21534* (CAS); **Fresno Co.:** not far from creek at outlet of South (Dinkey) Lkae, 20 August 1958, *Bacigalupi 6739* (CAS); Huntington Lake and vicinity; near Laekeshore, 29 July 1951, *Pollard s.n.* (CAS); bench above Deer Crk., n. shore Huntington L. (Lot 22 Upper Deer Crk. Tract)., 8 August 1951, *Quibell 496* (CAS); Glaciated Twin Lakes area, n. Kaiser Ridge and w. Potter Pass. 9000', 2/3 m. w. 8650' Island Twin L., over 1 m. e. of 10,300' Kaiser Pk., foot of s.d. corner ledged cliffs of 9900' n-s outlier paralleling Kaiser Ridge to e., on Ward Dich and trail to Geor, 21 August 1952, *Quibell 1251* (CAS); 9320' hill immediately w-sw of 9000' Mystery L. which is on a bench 200' above and s.e. of Dinkey Crk., lowest trib. N. Fk. Kings River, 5 August 1953, *Quibell 3146* (CAS); Big Keep Creek Canyon, 2 miles west of Huntington Lake, 26 June 1954, *Quibell 3743* (CAS); Ridge N. of Colby Meadows, 16 July 1952, *Raven 4361* (CAS); McClure Meadows to Evolution Meadows, 1 August 1952, *Raven 4795* (CAS); between Lausel Creek an dHopkins Creek along Mono Creek, 27 July 1953, *Raven 5920* (CAS); Hilgard Branch, Bear Creek, 10 July 1954, *Raven 7255* (CAS); ca. 68 km NE of Fresno (FSC), Sierra National Forest, limestone outcrop at Dinkey Lakes trailhead, T9S R26E S14 SE 1/4 of NW 1/4, xx°x'x" north, xxx°x'xx" west, 12 July 1996, *York 1146* (CAS); ca. 73 km NE of Fresno (FSC), Sierra National Forest, Dinkey Lakes Willderness, Dogtooth Peak, T9S R27E S16 NW 1/4 of NW 1/4, xx°x'xx" north, xxx°x'xx" west, 14 July 1996, *York 1220* (CAS); ca. 71 km NE of Fresno (FSC), Sierra National Forest, a few meters W of the Dinkey Lakes boundary, along the Dinkey Lake trail, T9S R26E S11 NE 1/4 of SE 1/4, xx°x'xx" north, xxx°x'xx" west, 20 July 1996, *York 1278* (CAS\*); **Madera Co.:** Agnew Pass Trail, 31 July 1941, *J.T. Howell 16555* (CAS); The Niche, East Fork of Granite Creek, 17 August 1958, *J.T. Howell 345553A* (CAS); **Mariposa Co.:** May Lake, 11 August 1938, *Bracelin 893A* (CAS); Buck Camp, south of Yosemite, 12 August 1890, *Congdon 4* (DS); Crescent Lake, 14 August 1895, *Congdon s.n.* (BH); Peregoy Meadow, 16 August 1938, *Hoover 3762* (CAS); 5 mi. sw of Glacier Point; Yosemite National Park, 15 July 1959, *Rose 59107* (CAS); **Mono Co.:** Mammoth Lakes Basin, 8 August 1938, *J.T. Howell 14432* (CAS); Cabin Creek, north tributary of Slate Creek, Sierra Nevada, 19 August 1954, *Munz 20018* (CAS); **Nevada Co.:** turn off from Hwy 80 at Soda Springs, 17 June 1981, *Best s.n.* (CAS); Soda Springs, 20 July 1881, *M.E. Jones s.n.* (CAS); about 1 mile north of Independence Lake on Webber Lake Road, 16 September 1965, *True 2650* (CAS); Sanford Lake just east of Grouse Ridge Lookout, 6 miles northeast of Yuba Gap, 11 August 1966, *True 3141* (CAS); Sagehen Creek Wildlife and Fisheries Station of the University of California, *True 3960* (CAS); N0.5 mi east of Webster Flat on Mogonigal Summit Road, 12 August 1970, *True 6268* (CAS); **Plumas Co.:** Bucks Lake area, summer 1975, *Griggs 316* (CAS); **San Bernardino Co.:** Fredalba Park, 1905, *S. Grant s.n.* (DS); Pine Crest, San Bernardino Mountains, 30 May 1919, *Munz 2809* (DS); San Bernardino; Mill Creek Mts., August 1881, *Parish 1161* (DS); Little Bear Valley, August 1884, *Parish 1698* (DS); Strawberry Mt., San Bernardino Mts., 5 June 1892, *Parish 2530* (BH); Bear Valley Dam, San Bernardino Mountains, 25 June 1895, *Parish s.n.* (BH); **San Diego Co.:** Dry Creek, San Bernardino Mts., 25 July 1902, *Abrams 2767* (DS); **Shasta Co.:** Manzanita Lake, Lassen Park, 13 July 1938, *Clean s.n.* (CAS); Hat lake -- Paradise meadow Trial; edge of blast area near Hat lake, 11 August 1957, *Gillett 1036* (CAS); **Sierra Co.:** Plumas National Forest; Beckwourth Ranger District; Sierra City NE quad; slopes between Haskell Pk and Hwy 98/Sulphur Cr., T21N R13E S17 SW 1/4, 28 August 1989, *Janeway 3533* (CAS\*); **Sonoma Co.:** Petaluma, 12 May 1880, *Congdon s.n.* (BH); **Tahoe Co.:** Angela Lake near summit, 15 August 1927, *Smith 2243* (CAS); **Teheema Co.:** Lower portion of Brokeoff Mountain tril, 1/4 mile above Sulphur Works Entrance Station, 18 August 1957, *Gillett s.n.* (CAS); **Tulare Co.:** Region of Upper Tule River: vicinity of Mountain Lake, 30 July 1895, *Dudley 965* (DS); Keweah River Valley; brook near Marble Fork, 10 August 1895, *Dudley 1790* (DS); Eagle Lake Trail near Mineral King, 25 July 1942, *J.T. Howell 17177* (CAS); Mineral King, 26 July 1942, *J.T. Howell 17257* (CAS); Bubbs Creek Canyon, 30 July 1948, *J.T. Howell 25190* (CAS); Mineral King Road, 22 July 1951, *J.T. Howell 28116* (CAS); Foot of Colby Pass on Kern-Kaweah River, 28 July 1936, *McCracken s.n.* (CAS); Crabtree Creek, 21 July 1954, *Raven 7509* (CAS); Sequoia National Forest; Hillside with NE aspect about 1/4 mile E of Lewis Camp just S off Trail 33E01., 16 July 1987, *Tallent 757* (CAS); **Tuolumne Co.:** Eagle Meadow, 3 July 1936, *Hoover 1481* (CAS); Tuolumne Meadows, 12 August 1938, *J.T. Howell 14555* (CAS); Near White Wolf Campground, Yosemite National Park, 9 July 1961, *Major 632*

(CAS); Yosemite Research Reserve about 1 mile south-southeast of Siesta Lake, T1S R1E S22 SW 1/4, 12 August 1978, *Powell s.n.* (CAS); **(no county)**: Glacier Point, Yosemite National Park, 12 August 1915, *Abrams 5443* (DS); Summit Lake, Lassen Volcanic National Park, 25 August 1948, *Bailey & Bailey 2982a* (CAS); head of Tuolumne River, Camp 119, 3 July 1863, *Brewer 1774* (CAS); *Calif. Geol. Survey 2317* (BH); **Riverside Co.**: San Jacinto Mts., at Keen-Alleni Camp, 1903, *Hasse s.n.* (DS); **(no county)**: Tuolumne, *Hoover 4508* (CAS); boundary line, Eldorado National Forest -- Upper Range Camp, 20 September 1926, *Kennedy 236* (DS); Lassen Volcanic National Park; between Echo & Upper Twin Lake, 6 August 1960, *Leschke 1713* (CAS\*); Kings Creek Camp Grounds, 24 September 1954, *Leschke s.n.* (CAS); Kings Creek Camp Grounds, 24 September 1954, *Leschke s.n.* (CAS); Eldorado National Forest, 17 July 1912, *Lyons 22* (CAS); **Nevada: Douglas Co.**: Genoa Peak Road south of Spooner Summit., 13 August 1974, *J.T. Howell 50847* (CAS); **Washoe Co.**: Mt. Rose highway, 6.6 miles from Incline, 2 August 1938, *J.T. Howell 14023* (CAS); Mt. Rose highway, 6.6 miles from Incline, 2 August 1938, *J.T. Howell 14025* (CAS\*); near Tm. Rose; Third Creek, 3 August 1938, *J.T. Howell 14140* (CAS); Summit Rose Mountain Grade, 28 July 1937, *Peirson 13610* (CAS\*); Little Valley, 10 July 1973, *Risser s.n.* (CAS); 9 mi. E of Incline, Summit of Mt. Rose Road, 26 July 1935, *Rose 35548* (CAS); Mt. Rose road, 10 mi. N of Incline, 30 July 1937, *Rose 37626* (CAS,ORE\*); summit of Mt. Rose Highway, 15 September 1938, *Rose 38290* (CAS,DS\*).

**Carex straminiformis**: **California: Fresno Co.**: Along outlet crk. From NW corner of 9796" Iland L to 9300' suth L below, near headwaters of Dinkey Crk. (lowest trib. N. Fk. Kings Riv.) - 1/2 M. N. of 10,435-10,612' Three Sisters Ridge., 5 August 1953, *Quibell 3043* (CAS); **Tulare Co.**: between Relection Lake and Harrison Pass, 1 August 1940, *J.T. Howell 15829* (CAS); Bubbs Creek Canyon, 26 July 1948, *J.T. Howell 25034* (CAS); summit of Boreal Plateau, southwest of Siberian Outpost, Mount Whitney region, Sierra Nevada, 27 August 1937, *Sharsmith 3440* (CAS); **Tuolumne Co.**: south of barn, Cooper's Meadow, 4 August 1964, *Fuller 12430* (CAS\*); **(no county)**: Tahoe National Forest, sec 33 near top ridge, Bowman range, 11 June 1926, *Smith 1936* (CAS); **Nevada: Washoe Co.**: Galena Creek, near Mt. Rose, 5 August 1938, *J.T. Howell 14231* (CAS\*); **Utah: Utah Co.**: Mt. Timpanogos, Wasatch Mts., near Emerald Lake, 15 August 1930, *Garrett 5735* (CAS).

**Carex subbracteata**: **Oregon: Coos Co.**: banks of South Coquille River, below Powers, 8 June 1929, *Henderson 10050* (OSC); Powers, 8 June 1929, *Leach 2487* (ORE); **Josephine Co.**: Grave Creek, S. W. Oregon, 22 May 1884, *T.J. Howell s.n.* (CAS);

**Carex subfusca**: **California: Mono Co.**: Owens River, along the river road near the foot of Whisky Creek, 8 July 1934, *Peirson 11166* (CAS); **Shasta Co.**: Manzanita Lake, Lassen Park, 13 July 1938, *Clean s.n.* (CAS); **Washington: Skamania Co.**: rocky island of a small lake, 13 August 1905, *Suksdorf 5230* (UC);

**Carex tahoensis**: **Canada: Alberta: Co.**: Mountain Park; Mt. Harris, 13 August 1925, *Malte 2096* (UC); **Wyoming: Albany Co.**: Telephone Mines, 2 August 1900, *Nelson 7936* (ORE);

**Carex tenera var. tenera**: **Canada; Saskatchewan**: Lifton, 28 July 1911, *Clokey 660* (UC).

## OREGON NATURAL HERITAGE INFORMATION CENTER RARE PLANT FIELD SURVEY FORM

Please complete all entries in the top section above the heavy line. Please complete as much as possible the more detailed section below the heavy line. You may use the back for comments or additional space. If possible, please attach a map of the location, preferably something of the same quality as a USGS 7.5' map.

Scientific Name: Carex constanceana

Date of Field Work: 4 August 2008 County: Lake Collection: XYes (# 15063; OSC#15063, to OSC), \_\_\_\_\_ No  
mo. day year coll #, herbarium

Directions: Road 34, a couple hundred feet west of mile post 20, 4.8 miles by road west of Road 28

Reporter: Carex Working Group Phone: 541 334-4499 (Otting) or 541 753-9240 (Wilson)

Address: 2710 Emerald Street, Eugene, Oregon 97403

**1. LOCATION** - Attach separate map or sketch a map indicating exact site, scale and proximity to prominent features.

- A. Plant found?  Yes  No If no, reason: \_\_\_\_\_
- B. Location: T35S R17E Sec 32 1/4 of \_\_\_\_\_ 1/4 (use back for more TRS)
- C. Source of GPS coordinates (circle one): GPS (make & model Explorist 100\_\_\_\_) or map (type & scale \_\_\_\_\_)  
GPS differentially corrected?  Yes  No  
Datum (circle): other WGS84. Easting xxxxxx , Northing xxxxxx  
Coordinate System (circle): UTM (Zone 10),
- D. Owner/Manager: privately owned, probably by Jen-Weld

**2. SPECIES BIOLOGY**

- A. Phenology: \_\_\_\_\_ % in flower, 100 % in fruit, \_\_\_\_\_ % in leaf
- B. Population size: Number of plants: 7 Area occupied: \_\_\_\_\_
- C. Age Class: \_\_\_\_\_ % seedlings, \_\_\_\_\_ % immature, \_\_\_\_\_ % 1<sup>st</sup> year, 100 % mature, \_\_\_\_\_ % senescent

**3. HABITAT**

Plant communities/Habitat Description/Associated species: Plants in or within a foot of ephemeral snow-melt channels on very gently south-facing slope (almost flat), in openings in patchy conifer woods. (Mixed forest now dominated by *Pinus contorta*, but with *P. ponderosa*, *Abies concolor*, and a little *Populus tremuloides*. Some openings with perennial grasses including *Danthonia californica*, others with mostly bare soil and annuals.)

- B. Aspect: south (enter compass direction(s) or degrees)
- C. Slope:  slight (0°-20°), \_\_\_\_\_ moderate (20°-45°), \_\_\_\_\_ extreme (45°+), \_\_\_\_\_ vertical
- D. Topographic position: plateau – low compared to slopes to north, but high above creek to south
- E. Light:  open,  filtered, \_\_\_\_\_ shade
- F. Moisture: \_\_\_\_\_ inundated, \_\_\_\_\_ saturated, in spring, probably moist; seasonally dry
- G. Elevation range: 6065 feet
- H. Substrate/soil: something brown and infertile-looking
- I. Visible threats/potential disturbance: No obvious immediate disturbance, but this place is logged & maybe grazed

**4. DETERMINATION** - How was plant identified? (choose one or more, please fill in the source for each choice)

keyed in flora,  compared with specimen,  compared with photo/drawing,  compared with specimens  
Source: FNA, Wilson et al. 2008, specimens including isotypes; all CWG members participated, and Peter Zika

**5. PHOTOGRAPHS/SLIDES**

Did you take a print or slide:  Yes (specify which), \_\_\_\_\_ No. May we obtain duplicates at our cost?  Yes \_\_\_\_\_ No

**OREGON NATURAL HERITAGE INFORMATION CENTER**  
**RARE PLANT FIELD SURVEY FORM**

Please complete all entries in the top section above the heavy line. Please complete as much as possible the more detailed section below the heavy line. You may use the back for comments or additional space. If possible, please attach a map of the location, preferably something of the same quality as a USGS 7.5' map.

Scientific Name: Carex cordillerana

Date of Field Work: 8 & 24 July, 2008 County: Lake Collection: \_\_\_\_\_ Yes (\_\_\_\_\_),  No  
 mo. day year coll #, herbarium

Directions: Deep Creek drainage in the North Warner Mountains, southeast of Lakeview. From the intersection of Forest Service roads 3915 and 4015, walk up and to the left on the north-facing slope. There's another smaller population about 1/2 mile up road 4015, above a spring, a hundred yards or so south of the road.

Reporter: Carex Working Group Phone: 541 334-4499 (Otting), 541 753-9240 (Wilson)

Address: 2710 Emerald Street, Eugene, Oregon 97403

**2. LOCATION** - Attach separate map or sketch a map indicating exact site, scale and proximity to prominent features.

E. Plant found?  Yes \_\_\_\_\_ No If no, reason: \_\_\_\_\_

F. Location: T \_\_\_\_\_ R \_\_\_\_\_ Sec \_\_\_\_\_ \_\_\_\_\_ 1/4 of \_\_\_\_\_ 1/4 (use back for more TRS)

G. Source of GPS coordinates (circle one): GPS (make & model Explorist 100) or map (type & scale \_\_\_\_\_)

GPS differentially corrected? \_\_\_ Yes \_\_\_ No

Datum (circle): Nad 27, Nad 83, other \_\_. Easting xxxxxx Northing xxxxxxx

Coordinate System (circle): UTM (Zone 10)

H. Owner/Manager: Fremont-Winema National Forest

**3. SPECIES BIOLOGY**

D. Phenology: \_\_\_\_\_ % in flower, 80% in fruit, \_\_\_\_\_ % in leaf

E. Population size: Number of plants: 70+ Area occupied: \_\_\_

F. Age Class: \_\_\_\_\_ % seedlings, \_\_\_\_\_ % immature, \_\_\_\_\_ % 1<sup>st</sup> year, 100% mature, \_\_\_\_\_ % senescent

**4. HABITAT**

Plant communities/Habitat Description/Associated species: The larger population was in nearly closed canopy *Abies concolor*, *Pinus ponderosa* forest on steep north-facing slope with little undergrowth but lots of woody debris. The smaller population was in an opening in more open *Pinus ponderosa*, *Abies concolor* forest, where there was little undergrowth, on a north-facing slope above a spring.

J. Aspect: north-facing (enter compass direction(s) or degrees)

K. Slope: \_\_\_\_\_ slight (0°-20°),  moderate (20°-45°),  extreme (45°+), \_\_\_\_\_ vertical

L. Topographic position:  lower slope

M. Light:  filtered,  shade

N. Moisture:  dry

O. Elevation range: 5734 to \_\_\_\_\_ feet

P. Substrate/soil: Brown, loose, forest soil.

Q. Visible threats/potential disturbance: Grazing; slope and downed wood minimizes grazing, but it occurs

**5. DETERMINATION** - How was plant identified? (choose one or more, please fill in the source for each choice)

We recognized it. It's really distinctive.

**6. PHOTOGRAPHS/SLIDES**

Did you take a print or slide: \_\_\_\_\_ Yes (specify which), I don't think so. No.

