

## A NEW SPECIES OF *POTENTILLA* (ROSACEAE) FROM CENTRAL IDAHO

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### ABSTRACT

We describe *Potentilla maryae* Ertter & Mansfield, **sp. nov.**, from Valley Co., Idaho. It combines characters of *P. glaucophylla* Lehm. var. *glaucophylla* and *P. gracilis* var. *fastigiata* (Nutt.) S. Wats. and is hypothesized to be a recently evolved species originating as a stabilized hybrid of these two species. The new species' highly restricted range and vulnerability to a variety of threats make it a strong candidate for conservation status.

One of the most intriguing finds of the 2017 Idaho Botanical Foray, to Bear Valley in the mountains of central Idaho (Smith 2017), was an unusual *Potentilla* (Rosaceae) that differed from any known species in sect. *Graciles* (sensu Ertter et al. 2015). These annual forays, initiated by James F. Smith in 2008, are yearly opportunities for anyone interested in native plants to converge on an under-collected part of Idaho (of which there is no shortage!) for an extended weekend of botanizing, networking, and general camaraderie. Even the most mundane of the hundreds of resultant group collections are valuable distribution records, and there are usually several new records of rare species and even new collections of species under evaluation as possible novelties. Most of the latter, however, are generally already represented by earlier collections that had been shoe-horned into existing species; in contrast, the new *Potentilla* was recognizably distinct from anything any of us had seen before (including the first author, a specialist on the genus).

On the first day of the Foray (Thursday, 6 July 2017), the second author and Beth Corbin drove en route to Dagger Falls, northeast of Bear Valley proper. Although relatively rugged, the dirt road is well-used, as the sole access for the Boundary Creek launch site for world-renowned float trips on the Middle Fork of the Salmon River (which flows through the Frank Church–River of No Return Wilderness, the largest contiguous wilderness in the Lower 48). One of their collecting sites along the road was Ayers Meadow, where they found an unusual *Potentilla* eagerly shown to the first author when she arrived the following afternoon. No fully comparable plants were found during the Foray itself, only an abundance of *P. glaucophylla* Lehm. var. *glaucophylla* and the usual bewildering array of *P. gracilis* Douglas ex Hook. morphotypes, primarily those currently encompassed by *P. gracilis* var. *fastigiata* (Nutt.) S. Wats. sensu lato. On her drive home, however, the first author found a large uniform population of plants matching the ones that Mansfield and Corbin had collected, in Bruce Meadows at the east end of Bear Valley, about two air miles south of Ayers Meadow. Most plants

were past flowering, so she returned the following June and caught the plants in peak flower, albeit partly closed due to rainy weather — this is the collection used for the type of the new species described here.

After the Foray, the *Potentilla* collections at the four main herbaria in Idaho (CIC, ID, IDS, SRP) and a key regional herbarium (WTU) were visited and searched by the first author. To our surprise, only a single previous collection of the new species was located, in spite of the abundance of other problematic morphotypes that currently plague sect. *Graciles* (Holmgren 1997; Ertter & Mansfield 2007; Ertter et al. 2015). This was SRP 012565, one of William N. Sparhawk’s specimens that were transferred to SRP from the Boise National Forest herbarium several decades ago. Intriguingly, Sparhawk identified the collection as “*Potentilla* [*glaucophylla*? or nov. sp.]” Although the collection

	<i>P. maryae</i>	<i>P. glaucophylla</i> var. <i>glaucophylla</i>	<i>P. gracilis</i> var. <i>fastigiata</i> s.l.
<b>stem length</b>	(1.5–)2–3.5(–4) dm	(0.5–)1–3(–4) dm	(0.5–)1.5–7(–12) dm
<b>petiole hairs</b>	sparse to moderately common, appressed, 0.5–1.2 mm long	absent or sparse (to abundant), usually appressed, 1–2 mm long	common to dense, appressed to spreading, 0.5–2(–3) mm long
<b>leaflet number</b>	(4)5(6)	5–6(7)	5–7(–9)
<b>leaflet shape</b>	narrowly cuneate to oblanceolate	oblanceolate or cuneate to obovate	oblanceolate to elliptic or narrowly obovate
<b>leaflet size</b>	(2–)4–6(–8.5) × (0.5–)1.5–2.5 cm	1–4(–6) × 0.5–1.5(–2) cm	(1.5–)2–7(–10) × (0.7–)1.5–3.5 cm
<b>portion of leaflet with teeth</b>	distal ¼–½ (rarely more)	distal ⅓–½(–⅔)	distal (⅔–)¾ to nearly entire length
<b>leaflet incision</b>	ca ½–¾ to midvein	ca ⅓–½ to midvein	ca ¼–½ to midvein
<b>leaflet teeth per side</b>	1–2(–4)	1–3(–5)	5–9(–11)
<b>leaflet tooth length</b>	5–12(–15) mm	1–5(–8) mm	2–10 mm
<b>leaflet color</b>	surfaces similar, green	surfaces similar, usually glaucous blue-green at least when fresh	surfaces ± similar to somewhat dissimilar, abaxial pale green to greenish gray, adaxial dark green to grayish green
<b>leaflet vestiture</b>	nearly glabrous except for sparse hairs on margins and main abaxial veins	hairs sparse (to abundant), often restricted to veins, distal teeth, and margins	hairs sparse to abundant (especially on veins)
<b>flower number</b>	(3–)5–12(–15)	2–10(–20)	(4–)10–50(–60)
<b>pedicel length</b>	1.5–3(–4) cm	(0.5–)1–3(–6.5) cm	0.3–3 cm
<b>sepal length</b>	4.5–6(–7) mm	(2–)2.5–4.5(–5) mm	4–8(–10) mm
<b>petal basal patch</b>	absent	usually absent	present or absent
<b>anther length</b>	0.5–0.8 mm	0.4–0.7(–0.9) mm	0.6–1.2(–1.6)
<b>carpel number</b>	20–25	25–40	(15–)30–50

Table 1. Comparison of diagnostic features of *Potentilla maryae*, *P. glaucophylla* var. *glaucophylla*, and *P. gracilis* var. *fastigiata*. Characters of the last two are primarily as given in Ertter et al. 2015, though omitting the hairier-leaved extremes of *P. glaucophylla* that do not occur in central Idaho. Leaflet measurements are based on the central leaflet of well-developed basal leaves.

label lacks locality information, this specimen is presumably one of the many collected by Sparhawk in the course of his study on the effect of sheep grazing on conifer reproduction in central Idaho (Sparhawk 1918). The study was conducted from 1912 through 1914 on three allotments: one on the Deadwood River, another on Silver Creek (a tributary of the Middle Fork of the Payette River), and a third on the South Fork of the Payette River. The closest of these allotments to Bruce and Ayers Meadows would be the one on the Deadwood River, perhaps Deadwood Valley itself before it was flooded by Deadwood Reservoir in 1931.

A standard taxonomic analysis of these collections was undertaken, i.e., measurements of pressed specimens, focused on the same characters previously ascertained to be taxonomically informative in *Potentilla* sect. *Graciles* (Ertter et al. 2015; Ertter & Mansfield 2007). The result was a suite of morphological characters that differs from the two most comparable species, *P. glaucophylla* and *P. gracilis*, as summarized in Table 1. To test whether any of these differences were simply the result of environmentally induced plasticity, living specimens of the *Potentilla* under investigation from Bruce Meadows were grown for several years in a common garden setting that included *P. glaucophylla* var. *glaucophylla* and several *P. gracilis* morphotypes. The common garden setting consisted of living material that was taken directly from wild populations (documented with corresponding herbarium specimens), transplanted into plastic pots, and grown side by side in the first author's backyard in Boise, Idaho. Observations of the living specimens confirmed that the differences noted in the standard taxonomic analysis remained stable in the common garden setting and were therefore genetically based. Additionally, plants from Bruce Meadows were much more difficult to grow in cultivation than were the other two species. We conclude that taxonomic recognition is merited as a new, geographically restricted *Potentilla* in sect. *Graciles* (sensu Ertter et al. 2015).

**POTENTILLA MARYAE** Ertter & Mansfield, **sp. nov.** **TYPE: USA. Idaho.** Valley Co.: E end of Bruce Meadow ca. 8 mi from Hwy 21, 0.3 mi E of airfield turnoff, 1 mi E of Dagger Falls jct, ca. 23 air mi NW of Stanley, seasonally dry meadow adjacent to lodgepole pine and low willows, 44.4192° N 115.3048° W, 1945 m elev, 17 Jun 2018, *B. Ertter 23157* (holotype: UC; isotypes: CIC, ID, MO, NY, RM, WIS, WTU + others to be distributed). Figures 1–5.

*Potentilla maryae* combines the open few-flowered inflorescence, relatively early phenology, sparse vestiture, and few-toothed leaflets of the common glabrate form of *P. glaucophylla* var. *glaucophylla* with the green leaflet color and somewhat larger size of *P. gracilis* var. *fastigiata*, differing from both species in its long slender leaflets with only 1–2(–4) teeth per side on the distal ¼–½ of the leaflet, the teeth 5–12(–15) mm long.

**Perennial**, ± tufted from short, sturdy, few-branched caudex, green, not or only inconspicuously glandular, cottony hairs absent. **Stems** ascending, (1.5–)2–3.5(–4) dm long, 2–2.5 times as long as basal leaves, sparsely short-hairy. **Leaves** palmate, the primary leaves basal; petiole (2–)4–9(–11) cm long, sparsely to moderately strigose, hairs tightly appressed, stiff, 0.5–1.2 mm long; leaflets (4)5(6), narrowly cuneate-oblongate, the central leaflet (2–)4–6(–8.5) × (0.5–)1.5–2.5 cm, the distal ¼–½ (rarely more) incised ca ½–¾ to midvein, teeth 1–2(–4) per side, ± tapering from base, ± acute, 5–12(–15) mm long, flaring ca 20–50° from the midvein, the surfaces similar, green, nearly glabrous except for sparse strigose hairs on margins and main abaxial veins, the hairs sometimes forming terminal tufts to ½ mm long; cauline leaves 1–2(–3), reduced in size. **Inflorescence** openly branched, (3–)5–12(–15)-flowered; pedicels ± straight, 1.5–3(–4) cm long. **Flowers:** hypanthium ca 2 mm deep, 4–5 mm wide; epicalyx bractlets ± narrowly lanceolate-oblong, 2–4 mm × 0.8–1.2 mm, ca (½–)⅔ as long as sepals; sepals 4.5–6(–7) mm long, acute to acuminate; petals broadly obovate to obcordate, ± retuse, 5–9 × 5–9 mm, > sepals, yellow, lacking darker basal patch; stamens 15–20, filaments (1–)2–2.5 mm long; anthers 0.5–0.8 mm long; carpels 20–25, styles ca 2–2.5 mm long, slender, not basally thickened. **Achenes** 1.3–1.6 mm long, light brown, sometimes with faint lines, smooth.

Flowering (May–) June (–July). Growing in seasonally wet meadows that dry out during the summer, ca. 1940–1950 m elevation. Associates: *Achillea millefolium*, *Agoseris glauca* var. *dasycephala*, *Antennaria corymbosa*, *Antennaria microphylla*, *Bistorta bistortoides*, *Calochortus eurycarpus*, *Camassia quamash*, *Carex pachystachya*, *Castilleja cusickii*, *Cirsium foliosum*, *Delphinium depauperatum*, *Festuca idahoensis*, *Fragaria virginiana*, *Geum triflorum*, *Mertensia* sp., *Micranthes oregana*, *Penstemon globosus*, *Rumex paucifolius*, *Trifolium longipes* var. *pedunculata*, *Wyethia* sp.

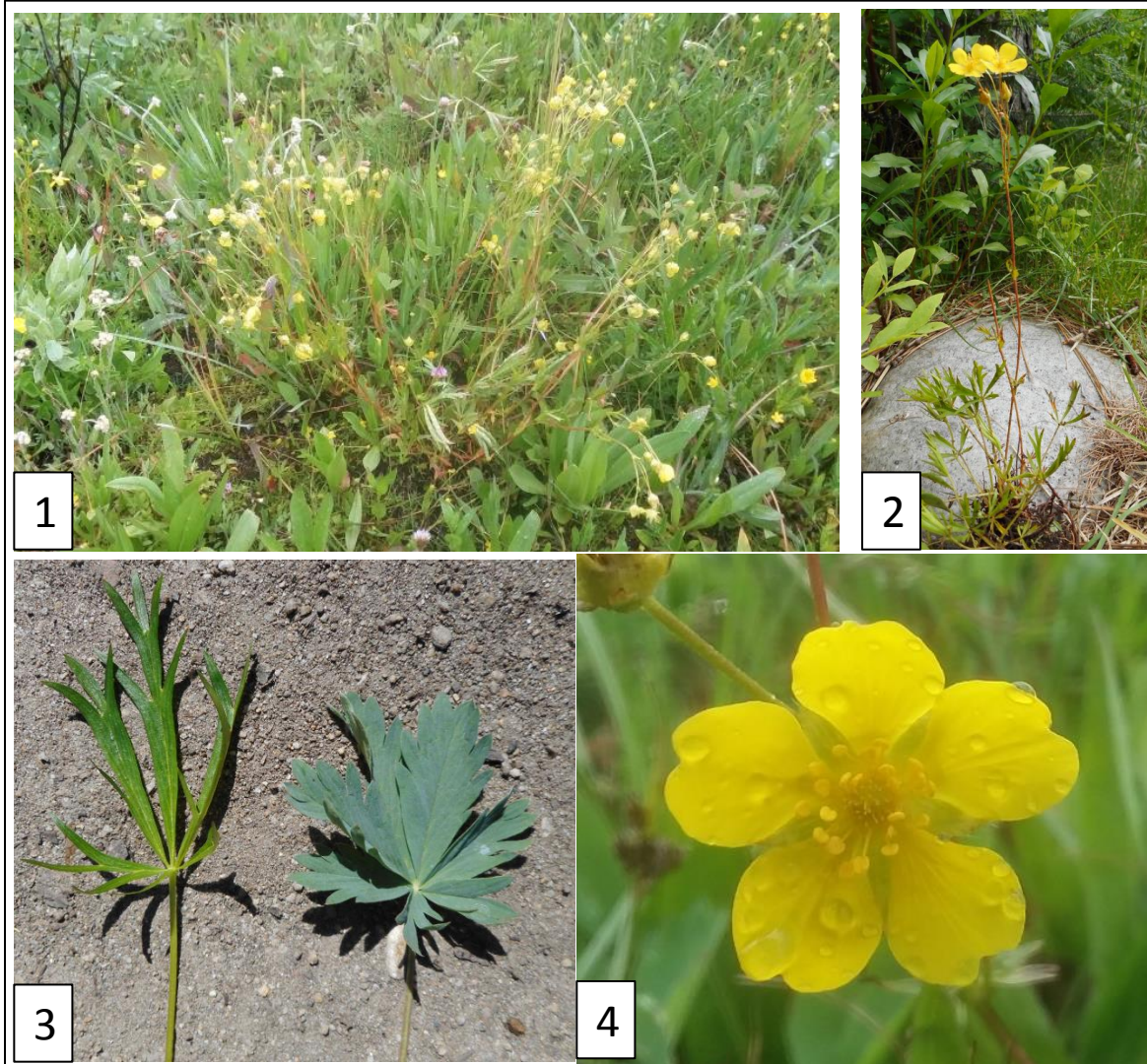


Figure 1. *In situ* habit of large *Potentilla maryae* on a rainy day.

Figure 2. Habit of *Potentilla maryae* (posed in *ex situ* setting for better contrast).

Figure 3. Fresh leaf of *Potentilla maryae* (left) and *P. glaucophylla* var. *glaucophylla* (right), both from common garden setting.

Figure 4. Flower of *Potentilla maryae*, on rainy day.

**Additional collections. Idaho.** Valley Co.: Type locality, 9 Jul 2017, *Ertter 22920* (ID, IDS, SRP, UC, WTU + others to be distributed); Ayers Meadow along road to Dagger Falls (Forest Service Road 568), Boise Natl Forest, organic loam soil, 44.44841° N 115.32193° W, 6372 ft, 6 Jul 2017, *Mansfield & Corbin 17146* (CIC, ID, IDS, SRP); [no locality, but probably Boise Natl Forest, possibly Deadwood Valley] 1913, *Sparhawk 49-1913* (SRP).



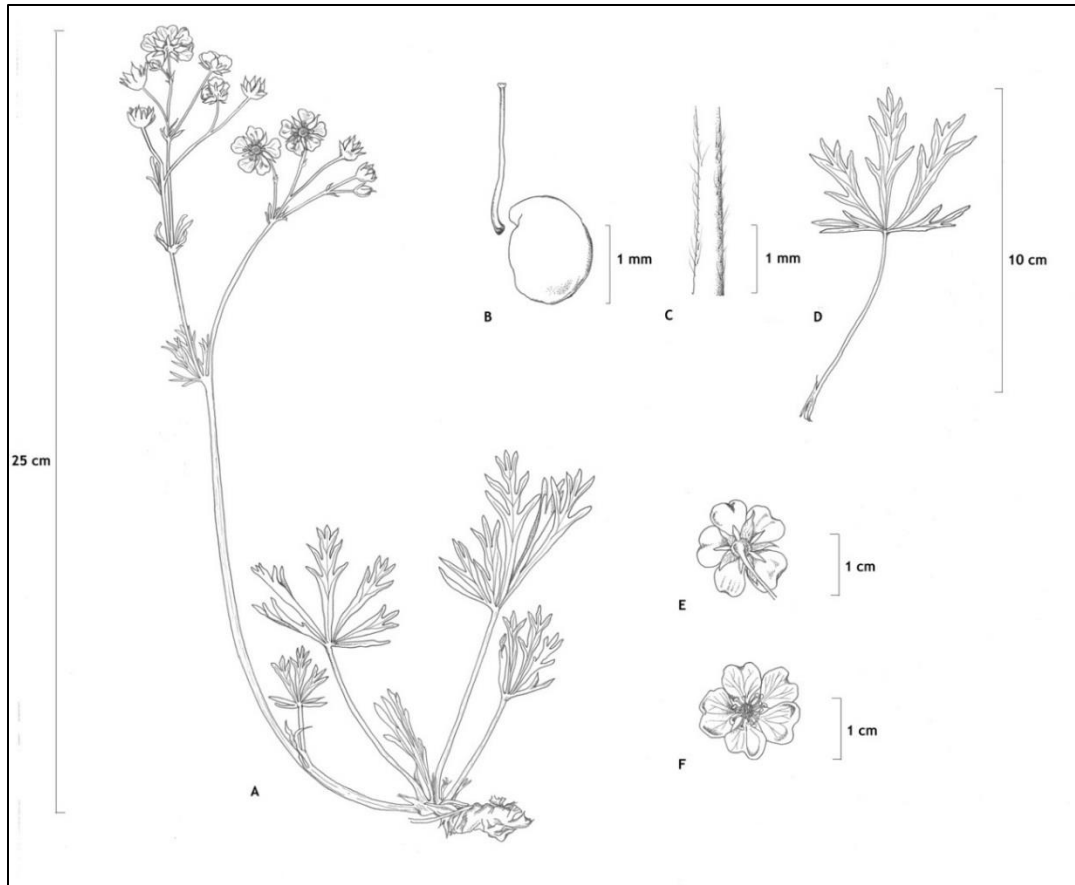


Figure 5. *Potentilla maryae*. A. Habit. B. Achene and style. C. Petiole vestiture. D. Basal leaf. E. Distal view of flower. F. Proximal view of flower. Line drawing by K. Pappani.



Figure 6. Mary Fitzgerald Patton (1928–2022). Photo by Rebecca Patton.

**Etymology.** Because this new *Potentilla* is an attractive Idaho endemic that grows right along the access road to a major launch site for popular float trips, we decided it was a prime candidate for fund-raising purposes. We donated the naming rights to one of the most effective conservation organizations in the state, the Idaho Conservation League, for their Wild Idaho! fundraiser in May 2022. The auction winner, ICL board chair Rebecca Patton, chose to honor her recently departed mother, Mary Fitzgerald Patton (1928–2022; Fig. 6): "Lover of nature that she passed on to her children, matriarch, educator, military wife & widow, traveler, survivor, mother, animal lover, brilliant writer and scrabble player, dedicated companion, keeper of quiet strength." Given Patton's expressed preference to use the first name, we are using the substantival epithet *maryae*, rather than the adjectival epithet *maryana* (otherwise traditional, but not required), to avoid possible confusion with Maryanne or variants of it. "Mary's cinquefoil" is proposed as the English vernacular name.

**Distribution and habitat.** *Potentilla maryae* is a surprisingly distinctive species known primarily from two populations at the east end of the Bear Valley area between Cascade and Stanley, in the heart of the Idaho Batholith in central Idaho. These populations are in Ayers Meadow and Bruce Meadows (Figs. 7-9), only about two miles apart. A single intermediate plant found near the Bear Valley Campground (Ertter 22909 [CIC]) suggests that there might be additional populations yet to be discovered in and around Bear Valley. The species might have also been historically present in Deadwood Valley, which lies about 20 air miles to the west-southwest of the primary populations, before that meadow was flooded to create a reservoir in 1931.

At the type locality in Bruce Meadows, *Potentilla maryae* was the most common representative of sect. *Graciles* occurring in the wettest openings of the seasonally dry meadow. Although various morphotypes of *P. gracilis* were present in slightly drier portions of both Bruce and Ayers meadows, no obvious intergradation with *P. maryae* was observed at either site. The highly restricted ecological and geographic range of the new species indicates a high level of habitat specificity, as also suggested by the relative difficulty of growing *P. maryae* in cultivation under the same conditions that were suitable for *P. gracilis* and *P. glaucophylla*.

**Possible hybrid origin.** *Potentilla maryae* combines features of *P. glaucophylla* var. *glaucophylla* and *P. gracilis* var. *fastigiata* sensu lato, the two most common and widespread *Potentilla* in the Pacific Northwest. Given that hybridization is a common evolutionary strategy in *Potentilla* (e.g., Soják 1986; Ertter et al. 2015), *P. maryae* very likely originated as the hybrid of these two taxa. While other putative natural hybrids of the same parents are routinely encountered, including elsewhere in Bear Valley (e.g., Ertter 22908 [CIC], Hitchcock & Muhlick 9723 [WTU]), Olson 374 [ID]), *P. maryae* is unique in occurring as relatively large, well-established populations with a uniform combination of features that differ from other presumed hybrids, or any previously described species. Its sparse vestiture, few-toothed leaflets, open few-flowered inflorescence, relatively early phenology (i.e., plants finish blooming by the time co-occurring morphotypes of *P. gracilis* are in early anthesis), relatively small anthers, and lack of a darker basal patch on the petals are all shared with sympatric morphotypes of *P. glaucophylla*, but the bright green leaflet color and overall size are more characteristic of *P. gracilis* var. *fastigiata*. The most distinctive features are the long slender leaflets that bear only 1–2(–4) teeth per side on the distal ¼–½ of the central leaflets, the teeth themselves being relatively long (5–12[–15] mm) and widely flaring (Fig. 3). This leaflet shape is not matched by either presumed parent, other putative hybrids in central Idaho, or any other species of *Potentilla* known to us. Given this, and with the extremely limited range, we hypothesize that *P. maryae* is a relatively recent, but now fully stabilized, distinct species of hybrid origin in sect. *Graciles*, with *P. glaucophylla* var. *glaucophylla* and *P. gracilis* var. *fastigiata* as the presumed parents.

Of other putative hybrids of *Potentilla glaucophylla* and *P. gracilis* most comparable to *P. maryae*, the majority retain the glaucous leaflet color characteristic of *P. glaucophylla* that is absent in *P. maryae*, and/or other characters such as shorter, less flaring, more numerous leaflet teeth, different

vestiture, dark basal patches on the petals, or denser, later-blooming inflorescences. Among collections we've examined that have leaflets most comparable to *P. maryae* are *Hitchcock & Muhlick 9167* (IDS) from Deerlodge Co., Montana, which has hairier leaves than *P. maryae*, and *Porsild & Breitung 10540* (WTU) from Yukon, Canada, which has more numerous, less flaring leaflet teeth. Leaflet color is not recorded for either collection, and it is not clear if these or other putative hybrids represent isolated individuals or morphologically stabilized populations.

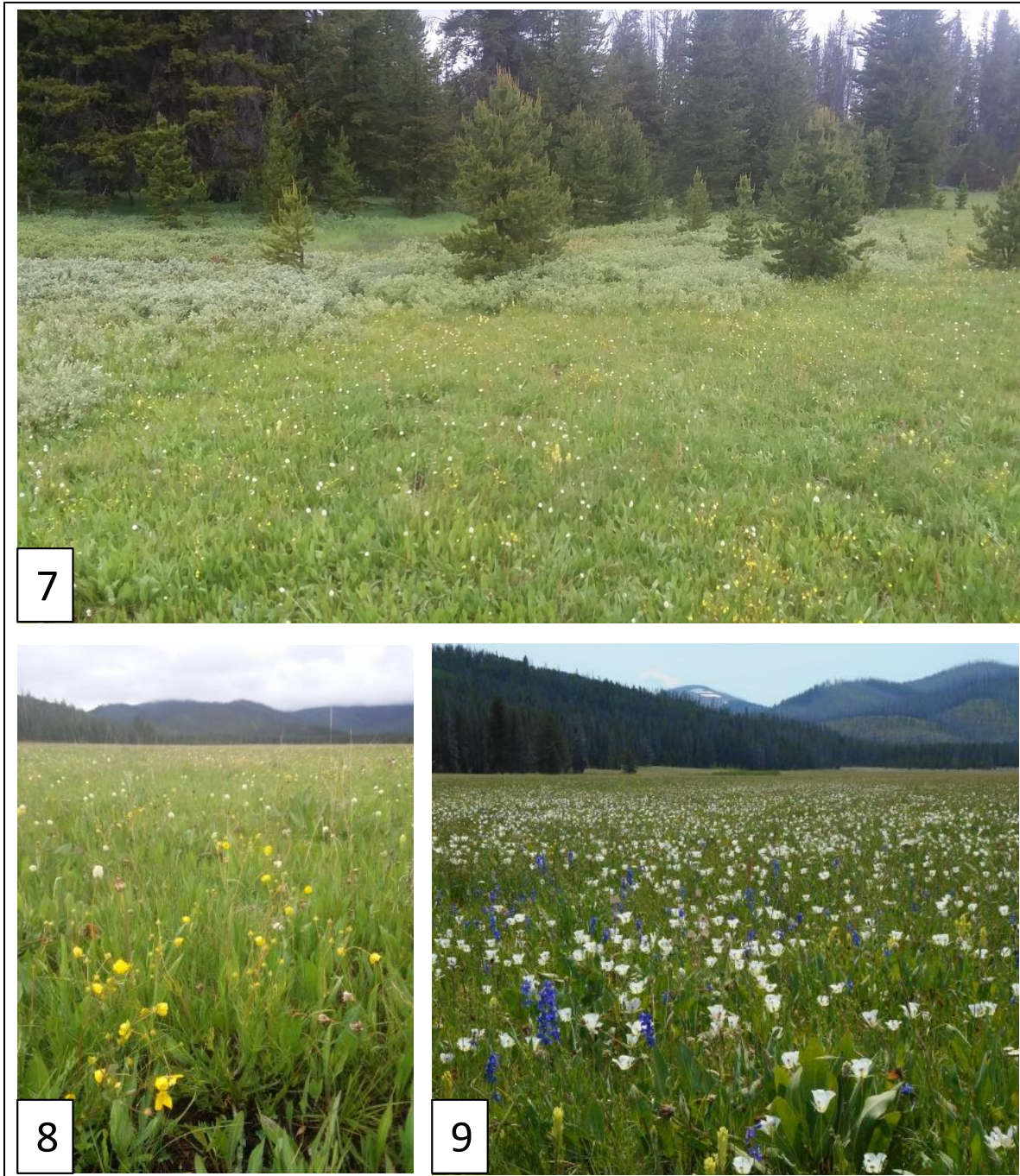


Figure 7. Habitat in Bruce Meadows with abundant *P. maryae*, looking north on rainy day, 17 June 2018; *P. maryae* in peak bloom but partly closed due to rain.

Figure 8. Also in Bruce Meadows on same day, looking south on opposite side of Boise NF Road 579.

Figure 9. Habitat of *Potentilla maryae* (past flowering) at same site as Fig. 8, 9 July 2017.



The primary candidate for recognition as another distinct taxon from comparable hybrid parentage is represented by the type of *Potentilla nuttallii* var. *glabrata* Lehm. Although this name has generally been considered a synonym of *P. gracilis* var. *fastigiata* (e.g., Holmgren 1997; Ertter et al. 2015), or even the correct name for this confusingly polymorphic variety of *P. gracilis* (e.g., Hitchcock et al. 1961), the type of var. *glabrata* itself belongs to what is probably a separate stabilized hybrid of *P. glaucophylla* and *P. gracilis*. This entity, which will be the focus of a future publication, shares the vestiture and open inflorescence of *P. glaucophylla* var. *glaucophylla* and *P. maryae*, but differs from the latter in having more narrowly oblanceolate glaucous leaflets to 8 cm long, incised on the distal ½–¾ or more with 5–8 teeth per side. Most collections, including the type, are from the Centennial Mountains of eastern Idaho and adjacent Montana, but comparable populations occur at least as far west as Bear Valley itself (e.g., *Smith & Smith 22-5* [CIC]).

**Conservation status.** The two known populations of *Potentilla maryae* are currently thriving under current forest management conditions, but the highly restricted geographic range, ecological specificity, and vulnerability to a variety of threats make this species a strong candidate for some level of conservation status. The Bruce Meadows population is bisected by Boise National Forest Road 579, an unpaved road that is nevertheless the shortest route between Stanley/Sawtooths and Cascade/McCall, two of Idaho's most popular recreational destinations. Any improvements to this road, or the nearby airstrip in Bruce Meadows, could have significant detrimental impacts to this population of *P. maryae*. Likewise, improvements to Boise National Forest Road 568, which is the primary access to a major launch site for floating the Middle Fork of the Salmon River, could negatively impact the Ayers Meadow population, as would the construction of any facilities at either site. Flat treeless areas near roads are furthermore prone to being degraded when used as staging areas for a variety of purposes, including forest thinning operations and fighting forest fires. Deterioration of current habitat due to climate change, changed hydrology, or dramatically increased grazing are other possible threats. The actual extent of populations in both meadows is currently unknown, and there are hopefully additional populations not yet discovered here and elsewhere, but until proven otherwise, the species should be considered both very rare and highly vulnerable.

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