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2019 Big Meadows Project Botanical Survey

Background

The Big Meadows Project comprises a xx-acre area made up of up to seven units of encroached aspen within Siskiyou County, California, and spanning T43N, R10W, Sections 7 and 18. The headwaters of Big Meadows Creek in up to three branches flow through the project area. Elevations within the project area range from just over 6,000 feet to nearly 6,500 feet. Kindig-Neuns gravelly loams comprise the project area at 15-50% slopes; these are well-drained gravelly to sandy loam and weathered bedrock soils.

In March 2018, California Department of Fish and Wildlife Environmental Scientist Merissa Hanisko prepared a botanical scoping list for the Big Meadows project. Merissa queried the California Natural Diversity Database (CNDDDB) and the California Native Plant Society (CNPS) Rare Plant Inventory for all California Rare Plant Rank 1A, 1B, 2A, 2B, or 3 plants within the USGS 7.5' quadrangles that the project occurs within (i.e., Boulder Peak) and the eight adjacent quadrangles (i.e., Grider Valley, Scott Bar, Russell Peak, Marble Mountain, Greenview, English Peak, Yellow Dog Peak, and Etna). She added four species that don't occur in the CNDDDB or CNPS nine quad searches, which all have very few and/or widespread occurrences and potential to occur in the project area. Merissa noted the query is broad and includes plants that occur at all elevations and habitat types. The scoping list follows in Appendix A.

Methods

Along with a list CDFW and USFWS staff compiled June 19, 2018, Sori Ecocultural Services conducted floristic plant surveys guided by the scoping list August 13 2018, July 5 and 6, 2019 and July 22 and 23, 2019. In August 2018, many plant species had begun to senesce or had already gone dormant; thus, additional surveys were carried out in summer 2019. Late lasting snow prevented earlier visits to the project area; however, in early July 2019 even early season species were persistent at least in fruit. Plant surveys consisted of walking the entire project area in n-s and e-w lines, including aspen stands proposed for conifer thinning and buffers surrounding the stands to consider canopy cover change, skid trails, access corridors, and landings. Distance between transects was 10 meters. Surveys noted all plant species observed and considered all species on the scoping list; the potential for discovering rare species was not limited to the scoping list. Where found, rare plants were flagged with red and orange flagging tape.

Findings

During the course of the surveys, *Polemonium carneum* (California Rare Plant Rank 2B.2 – rare, threatened, or endangered in CA; common elsewhere) was found within several of the encroached aspen stands. However, the *Polemonium* noted in the encroached aspen stand in the south meadow was vegetative only and not confirmed in flower, but was growing near water. Note *Polemonium californicum* was also observed in the project area in drier locations and is easily distinguished from POLCAR due to the hairy nature of the plants, the strong odor the plants emit when rubbed, and blue flowers. POLCAR plants are smooth, lack a strong odor, and have pale orange to cream-colored flowers. Heightened bear activity during return botanical surveys in July 2019 made confirmation of the *Polemonium* sp. in unit 4 challenging.

Nearly 300 POLCAR plants were estimated in small clusters of 5-100 plants throughout the project area. In August 2018, plants had begun to senesce and flower color was no longer evident. In early July 2019, plants were in full bloom and later July persisting in bloom or beginning to senesce. Generally, POLCAR was observed growing in aspen-conifer edges in partial sun/shade, where moisture persists later in summer from the presence of seeps, springs or ephemeral streams. Logging practices should prevent a significant reduction of the local POLCAR population and avoid extirpation of POLCAR from this location. Thinning as part of the proposed restoration project may however facilitate more available moisture and more partial sun/shade conditions in aspen understory, which could benefit the population and encourage expansion. In some areas, closed canopy conditions, dry, barren understories, and decadent downed wood could inhibit POLCAR growth. POLCAR is a perennial plant that can spread by rhizome or seed. Appendix B offers a plant list compiled during walking

surveys. See Appendix C for a map of POLCAR locations and associated KML/Z files. Note not all plants were identified to species for time savings during surveys; the project area encompasses impressive floristic diversity and spans plant communities within aspen meadows, wet meadows, mesic meadows, rocky outcrops, conifer forest, stream corridors and springs/seeps within meadows and aspen-conifer stands. The plant list reflects a utilitarian survey of areas to be encountered during thinning and log transport operations.

No other target species were observed during the surveys. *Triteleia lilacina*, a species endemic to California, not listed, but potentially out of its known range, was likely observed in the project area, as was *Triteleia crocea*, both varieties of which are listed California Rare Plant Rank 4.3. *T. crocea* is a perennial bulb and was observed on the drier edges of conifer stands.

Carex species were observed in the meadows surrounding the units within the project area, but did not exhibit characteristics of *Carex klamathensis* (which is rhizomatous, inconspicuous, and occupies serpentine fens) or *Carex nardina* (which is densely cespitose, narrow leaved, and occupies dry, open, high-elevation areas). *Erythronium grandiflorum* ssp. *grandiflorum* were noted in meadows surrounding the units with easily distinguishable green leaves lacking any mottling; thus, *Erythronium hendersonii* were not observed and are not suspected to be in the project area. An herbaceous *Gallium* sp. was observed in the project area, not woody like *Gallium serpicum* ssp. *scotticum*. A phacelia species, likely *Phacelia cf hastata* was observed in the project area, with widely lanceolate to elliptic leaves, not narrowly lanceolate and smaller in stature like *P. greenei*. *Epilobium* and *Eriogonum* plants observed did not resemble or exhibit characteristics of rare species included on the scoping list. And, no *Lewisia* spp. or *Horkelia* sp. were observed within the areas surveyed. All species were observed during surveys.

Katie MacKendrick holds degrees in natural resources from the University of Wisconsin-Madison and community and regional planning from the University of Oregon, and is a graduate of and instructor for the Columbines School of Botanical Studies based in Eugene, Ore. She has worked as a botanist and plant ecologist for nearly 20 years, 12 of which in the Pacific Northwest.

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Appendix A. Big Meadow Restoration Botanical Scoping (prepared by CDFW Environmental Scientist Merissa Hanisko)														
Latin Name	Common Name	Family	Lifeform	CA Rare Plant Rank	G Rank	S Rank	STATE Status	FED Status	Bloom Period	Elevation				Habitat/Micro Habitat
										Low (m)	High (m)	Low (ft)	High (ft)	
Abies amabilis	Pacific silver fir	Pinaceae	perennial evergreen tree	2B.3	G5	S2	None	None		1700	2195	5575	7200	Upper montane coniferous forest
Abies lasiocarpa var. lasiocarpa	subalpine fir	Pinaceae	perennial evergreen tree	2B.3	G5T5	S3	None	None		945	2225	3100	7300	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest
Arabis rigidissima var. rigidissima	Trinity Mountains rockcress	Brassicaceae	perennial herb	1B.3	G3T3	S3	None	None	Jun-Aug	1190	2200	3900	7220	Upper montane coniferous forest (gravelly or rocky)
Atriplex pusilla	smooth saltbush	Chenopodiaceae	annual herb	2B.1	G4	SH	None	None	Jun-Sep	1300	2000	4265	6560	Great Basin scrub, Meadows and seeps (hot springs)/alkali
Botrychium pinnatum	northwestern moonwort	Ophioglossaceae	perennial rhizomatous herb	2B.3	G4?	S2	None	None	Jul-Oct	1770	2040	5805	6695	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest/mesic
Botrypus virginianus	rattlesnake fern	Ophioglossaceae	perennial herb	2B.2	G5	S2	None	None	Jun, Aug, Sep	715	1355	2345	4445	Bogs and fens, Lower montane coniferous forest (mesic), Meadows and seeps, Riparian forest/streams
Campanula wilkinsiana	Wilkin's harebell	Campanulaceae	perennial rhizomatous herb	1B.2	G2	S2	None	None	Jul-Sep	1270	2600	4165	8530	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest
Carex	Klamath	Cypera	perennial	1B.2	G2	S2	None	None		1000	1140	3280	3740	Chaparral, Cismontane

klamathensis**	sedge	ceae	rhizomatous herb											woodland, Meadows and seeps/serpentinite
Carex nardina	nard sedge	Cyperaceae	perennial herb	2B.2	G4G5	S1	None	None	Aug-Sep	2105	2175	6905	7135	Subalpine coniferous forest/Carbonate, rocky outcrops.
Chaenactis suffrutescens	Shasta chaenactis	Asteraceae	perennial herb	1B.3	G3	S3	None	None	May-Sep	750	2800	2460	9185	Lower montane coniferous forest, Upper montane coniferous forest/sandy, serpentinite
Drosera anglica	English sundew	Droseraceae	perennial herb (carnivorous)	2B.3	G5	S2	None	None	Jun-Sep	1300	2255	4265	7400	Bogs and fens, Meadows and seeps (mesic)
Epilobium oregonum	Oregon fireweed	Onagraceae	perennial herb	1B.2	G2	S2	None	None	Jun-Sep	500	2240	1640	7350	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest/mesic
Epilobium luteum**	yellow willow herb	Onagraceae	perennial stoloniferous herb	2B.3	G5	S1	None	None	Jul-Sep	1500	2195	4920	7200	Lower montane coniferous forest (along streams and seeps), Meadows and seeps
Epilobium siskiyouense	Siskiyou fireweed	Onagraceae	perennial herb	1B.3	G3	S3	None	None	Jul-Sep	1700	2500	5575	8200	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest/rocky, serpentinite
Eriogonum diclinum	Jaynes Canyon buckwheat	Polygonaceae	perennial herb	2B.3	G3	S3	None	None	Jun-Sep	1700	2400	5575	7875	Upper montane coniferous forest (often serpentinite)
Eriogonum hirtellum	Klamath Mountain buckwh	Polygonaceae	perennial rhizomatous herb	1B.3	G2G3	S2S3	None	None	Jul-Sep	610	1900	2000	6235	Chaparral, Lower montane coniferous forest, Upper montane coniferous

	eat													forest/serpentinite
Eriogonum umbellatum var. glaberrimum	Warner Mountains buckwheat	Polygonaceae	perennial herb	1B.3	G5T2 ?	S2	None	None	Jun- Sep	1525	2405	5000	7890	Great Basin scrub, Lower montane coniferous forest, Upper montane coniferous forest/sandy or gravelly
Eriogonum umbellatum var. lautum	Scott Valley buckwheat	Polygonaceae	perennial herb	1B.1	G5T1	S1	None	None	Jul- Sep	800	900	2620	2955	Cismontane woodland, Lower montane coniferous forest/sandy to gravelly flats
Eriogonum ursinum var. erubescens	blushing wild buckwheat	Polygonaceae	perennial herb	1B.3	G3G4 T3	S3	None	None	Jun- Sep	750	1900	2460	6235	Chaparral (montane), Lower montane coniferous forest/Rocky, scree, talus
Erythronium hendersonii	Henderson's fawn lily	Liliaceae	perennial bulbiferous herb	2B.3	G4	S2	None	None	Apr- Jul	300	1600	980	5250	Lower montane coniferous forest
Galium serpenticum ssp. scotticum	Scott Mountain bedstraw	Rubiaceae	perennial herb	1B.2	G4G5 T2	S2	None	None	May- Aug	1000	2075	3280	6810	Lower montane coniferous forest (serpentinite)
Gentiana plurisetosa	Klamath gentian	Gentianaceae	perennial herb	1B.3	G2G3	S2	None	None	Jul- Sep	1200	1900	3935	6235	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest/mesic
Hemieva ranunculifolia	buttercup- leaf sukksdorfia	Saxifragaceae	perennial herb	2B.2	G5	S2	None	None	Jun- Aug	1500	2500	4920	8200	Meadows and seeps, Upper montane coniferous forest/mesic, rocky, granitic
Horkelia daucifolia var. indicta**	Jepson's horkelia	Rosaceae	perennial herb	1B.1	G4T1	S1	None	None	Apr- Jun	240	670	785	2200	Cismontane woodland/Quaternary pyroclastic flows, clay, volcanic, vernal mesic, openings.
Lewisia	Heckner	Montia	perennial	1B.2	G4T3	S3	None	None	May	225	2100	735	6890	Lower montane

cotyledon var. heckneri	's lewisia	ceae	herb						-Jul					coniferous forest (rocky)
Lewisia cotyledon var. howellii	Howell's lewisia	Montia ceae	perennial herb	3.2	G4T4 Q	S2	None	None	Apr-Jul	150	2010	490	6595	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest/rocky
Meesia longiseta	long seta hump moss	Meesia ceae	moss	2B.3	G5	S2	None	None		1750	3045	5740	9990	Bogs and fens, Meadows and seeps, Upper montane coniferous forest/Carbonate, on soil
Mielichhoferia mielichhoferiana	Mielichhofer's copper moss	Mielichhoferia ceae	moss	2B.3	G4	S1	None	None		1975	1975	6475	6480	Subalpine coniferous forest
Phacelia greenei	Scott Valley phacelia	Hydrophyllaceae	annual herb	1B.2	G2	S2	None	None	Apr-Jun	800	2440	2620	8005	Closed-cone coniferous forest, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest/serpentinite
Polemonium carneum	Oregon polemonium	Polemoniaceae	perennial herb	2B.2	G3G4	S2	None	None	Apr-Sep	0	1830	0	6005	Coastal prairie, Coastal scrub, Lower montane coniferous forest
Polystichum lonchitis	northern holly fern	Dryopteridaceae	perennial rhizomatous herb	3	G5	S3	None	None	Jun-Sep	1800	2600	5905	8530	Subalpine coniferous forest, Upper montane coniferous forest/granitic or carbonate
Potamogeton robbinsii	Robbins' pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	2B.3	G5	S3	None	None	Jul-Aug	1530	3300	5015	10825	Marshes and swamps (deep water, lakes)
Potentilla cristae	crested potentilla	Rosaceae	perennial herb	1B.3	G2	S2	None	None	(Jul) Aug-Sep	1800	2800	5905	9185	Alpine boulder and rock field, Subalpine coniferous

														forest/seasonally mesic, often serpentinite seeps, gravelly or rocky
Saxifraga cespitosa	tufted saxifrage	Saxifragaceae	perennial herb	2B.3	G5	S1	None	None	Jun-Sep	915	1980	3000	6495	Meadows and seeps (mesic, rocky)
Selaginella scopulorum	Rocky Mountain spike-moss	Selaginellaceae	perennial rhizomatous herb	3	G4G5	S2S3	None	None	Aug	1500	2200	4920	7220	North Coast coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest/decomposed granitic, rocky
Shepherdia canadensis **	Canadian buffaloberry	Elaeagnaceae	perennial shrub	2B.1	G5	S1	None	None	Apr-Jul	1731	1731	5675	5680	Upper montane coniferous forest/streamside, serpentinite, rocky
Tauschia howellii	Howell's tauschia	Apiaceae	perennial herb	1B.3	G2G3	S2S3	None	None	Jun-Aug	1705	2500	5590	8200	Subalpine coniferous forest, Upper montane coniferous forest/granitic, gravelly
Trifolium siskiyouense	Siskiyou clover	Fabaceae	perennial herb	1B.1	GH	SH	None	None	Jun-Jul	880	1500	2885	4920	Meadows and seeps (mesic)/sometimes streambanks
Vaccinium coccineum	Siskiyou Mountains huckleberry	Ericaceae	perennial deciduous shrub	3.3	G3Q	S2S3	None	None	Jun-Aug	1095	2135	3590	7005	Lower montane coniferous forest, Upper montane coniferous forest/often serpentinite
Vaccinium scoparium	little-leaved huckleberry	Ericaceae	perennial deciduous shrub	2B.2	G5	S3	None	None	Jun-Aug	1036	2200	3395	7220	Subalpine coniferous forest (rocky)

**Species not reported in the California Natural Diversity Database or California Native Plant Society 9 Quad searches. Added to the scoping by M. Hanisko

Appendix B. Big Meadows Restoration – Plant Surveys Species Observed June 19, 2018, August 13 2018, July 5 and 6, 2019 and July 22 and 23, 2019

Latin Name	Common Name
<i>Achillea millefolium</i>	common yarrow
<i>Acmispon americanus</i>	American bird's foot trefoil
<i>Aconitum columbianum</i>	Columbian monkshood
<i>Allium sp.</i>	wild onion
<i>Allium validum</i>	swamp onion
<i>Amelanchier cf alnifolia</i>	serviceberry
<i>Angelica arguta</i>	Lyall's angelica
<i>Antennaria sp.</i>	pussytoes
<i>Aquilegia formosa</i>	western columbine
<i>Arabis sp.</i>	rockcress
<i>Arctostaphylos sp.</i>	manzanita/kinnikinnick
<i>Arnica cordifolia</i>	heartleaf arnica
<i>Arnica sp.</i>	arnica
<i>Aster sp.</i>	aster
<i>Bistorta bistortoides</i>	American bistort
<i>Bromus sp.</i>	brome
<i>Calochortus elegans</i>	Northwestern mariposa lily
<i>Caltha leptosepala</i>	white marsh marigold
<i>Carex spp.</i>	sedges
<i>Castilleja miniata</i>	great red paintbrush
<i>Castilleja tenuis</i>	hairy paintbrush
<i>Circaeae alpina</i>	enchanter's nightshade
<i>Cirsium sp.</i>	thistle
<i>Collinsia sp.</i>	blue-eyed mary
<i>Collomia grandiflora</i>	large-flowered collomia
<i>Dactylis glomerata</i>	orchard grass
<i>Danthonia sp.</i>	oatgrass
<i>Delphinium glaucum</i>	glaucus larkspur
<i>Delphinium sp.</i>	larkspur
<i>Deschampsia caespitosa</i>	tufted hairgrass
<i>Elymus elymoides</i>	squirreltail grass
<i>Elymus glaucus</i>	blue wildrye
<i>Elymus trachycaulis</i>	slender wheatgrass
<i>Epilobium ciliatum</i>	fringed willowherb
<i>Epilobium minutum</i>	chaparral willowherb
<i>Epilobium saximontanum</i>	Rocky Mountain willowherb
<i>Epilobium sp.</i>	willowherb
<i>Erigeron glacialis</i>	subalpine fleabane
<i>Eriogonum sp.</i>	buckwheat
<i>Eriogonum umbellatum</i>	sulphur buckwheat
<i>Eriophyllum lanatum</i>	wooly sunflower
<i>Erythranthe guttatus</i>	common monkeyflower
<i>Erythranthe primuloides</i>	primrose monkeyflower

<i>Erythronium grandiflorum</i> ssp. <i>grandiflorum</i>	glacier lily
<i>Festuca</i> sp.	fescue
<i>Frasera radiata</i>	monument plant
<i>Frasera</i> sp.	green gentian
<i>Fritillaria affinis</i>	chocolate lily
<i>Gallium aparine</i>	Northern bedstraw
<i>Gallium</i> sp.	bedstraw
<i>Geum</i> sp.	avens
<i>Hastingsia</i> sp.	rushlily
<i>Helenium bigelovii</i>	Bigelow's sneezeweed
<i>Hordeum brachyantherum</i>	meadow barley
<i>Hydrophyllum</i> sp.	waterleaf
<i>Juncus</i> spp.	rushes
<i>Lathyrus</i> sp.	pea
<i>Leptosiphon</i> sp.	phlox
<i>Ligusticum</i> sp.	licoriceroot
<i>Lillium pardalinum</i>	leopard lily
<i>Lupinus polyphyllus</i>	bigleaf lupine
<i>Lupinus</i> sp.	lupine
<i>Madia bolanderi</i> (<i>Kyhosia bolanderi</i>)	Bolander's madia
<i>Madia exigua</i>	small tarweed
<i>Madia glomerata</i>	mountain tarweed
<i>Maianthemum</i> sp.	false solomon's seal
<i>Mentha arvensis</i>	field mint
<i>Microsteris gracilis</i>	slender phlox
<i>Monardella odoratissima</i>	mountain pennyroyal
<i>Montia</i> sp.	miners' lettuce
<i>Orobanche uniflora</i>	one-flowered broomrape
<i>Orthocarpus cuspidatus</i>	Copeland's owl's clover
<i>Osmorhiza bertori</i>	sweet cicely
<i>Osmorhiza occidentalis</i>	western sweet cicely
<i>Penstemon cf parvulus</i>	slight penstemon
<i>Penstemon</i> sp.	penstemon
<i>Perideridia</i> sp.	yampah
<i>Phacelia hastata</i>	silverleaf phacelia
<i>Phacelia</i> sp.	phacelia
<i>Phleum pratensis</i>	timothy
<i>Platanthera dilatata</i> var. <i>leucostachys</i>	Sierra bog orchid
<i>Poa bulbosa</i>	bulbous bluegrass
<i>Poa</i> sp.	bluegrass species
<i>Polemonium californicum</i>	moving polemonium
<i>Polemonium carneum</i>	Oregon polemonium
<i>Potentilla glandulosa</i>	sticky cinquefoil
<i>Potentilla gracilis</i>	slender cinquefoil
<i>Primula jeffreyi</i>	Sierra shooting star
<i>Prunella vulgaris</i> var. <i>lanceolata</i>	selfheal

<i>Ranunculus orthorhyncus</i>	straight-beaked buttercup
<i>Ranunculus sp.</i>	buttercup
<i>Ribes cf cereum</i>	wax currant
<i>Ribes sp.</i>	gooseberry/currant
<i>Rosa sp.</i>	rose
<i>Rumex acetosella</i>	sheeps sorrel
<i>Rumex salicifolius</i>	willow dock
<i>Salix sp.</i>	willow
<i>Sanicula sp.</i>	sanicle
<i>Saxifraga sp.</i>	saxifrage
<i>Senecio triangularis</i>	arrowleaf groundsel
<i>Sidalcea oregana</i>	Oregon checkermallow
<i>Sisyrinchium sp.</i>	blue-eyed grass
<i>Sorbus sp.</i>	mountain ash
<i>Spiraea douglasii</i>	Douglas's spirea
<i>Stachys rigida</i>	rough hedgenettle
<i>Symphoricarpos albus</i>	snowberry
<i>Thalictrum fendleri</i>	Fendler's meadowrue
<i>Trifolium eriocephalum</i>	woolyhead clover
<i>Trifolium longipes</i>	longstalk clover
<i>Trifolium sp.</i>	clover
<i>Trifolium willdenovii</i>	tomcat clover
<i>Trillium ovatum</i>	western trillium
<i>Trillium sp.</i>	trillium
<i>Triteleia cf lilacina</i>	foothill triteleia
<i>Triteleia crocea</i>	yellow triteleia
<i>Valeriana sitchensis</i>	Sitka valerian
<i>Veratrum californicum</i>	California false hellebore
<i>Vicia sativa</i>	common vetch
<i>Vicia sp.</i>	vetch
<i>Viola sp.</i>	violet
<i>Wyethia angustifolia</i>	narrowleaf mules ears

Appendix C. Map of *Polemonium carneum* observations within Big Meadows Restoration Area

