



Figure 1. Oak woodland and pine-oak forest vegetation in the Sierra la Elenita. Photo by Thomas R. Van Devender.

Preliminary Flora and Vegetation of the Sierra la Elenita–la Mariquita Sky Island Complex, Sonora, Mexico

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Abstract

We present a preliminary vascular flora for the Sierra la Elenita–la Mariquita Sky Island complex near Cananea, Sonora, Mexico. Expeditions and collecting trips between 2009 and 2018, along with historical collections, recorded 320 taxa in 65 families, with Asteraceae (55 taxa), Poaceae (41 taxa), and Fabaceae (36 taxa) as the most diverse families.

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Introduction

In the 1860s, geologist and raconteur Raphael Pumpelly described the isolated mountain ranges in Arizona, New Mexico, and Sonora as “islands from the sea” (Wallace 1965). These Sky Islands (*Islas Serranas* in Spanish) are surrounded by “seas” of grassland, desertscrub, thornscrub, or tropical deciduous forest. Here we present the preliminary vascular flora for the Sierra la Elenita–la Mariquita Sky Island complex in northern Sonora, Mexico.

The two sierras directly west and northwest of the town of Cananea are connected by a belt of oak woodland at 1,862 m. (6,108 ft.) elevation in Puerto Cananea, 34 kilometers (21.2 mi) south of the Arizona border. The elevations are 1,307–

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Sierra la Elenita–la Mariquita Sky Island Complex *continued*

2,486 m. (4,288–8,156 ft., range of 1,179 m. [3,868 ft.]) in the Sierra la Elenita (Figure 1) and 1,230–2,498 m. (4,035–8,196 ft., range of 1,268 m. [4,161 ft.]) in the Sierra la Mariquita. The eastern slopes of the mountain complex are in the headwaters of the San Pedro River that flows northward into Arizona. The western slopes of both ranges drain toward the Arroyo Cuitaca, which joins the Río Cocóspera and eventually the Río Magdalena. The south end of the Sierra la Elenita drains to the Río Bacanuchi, which flows into the Río Sonora.

The Sierra la Elenita is owned by the private mining company Mina Buenavista del Cobre, with inholdings by Ejido Vicente Guerrero, Mina Frisco, and other private interests. General Ignacio Pesqueira, the Governor of Sonora, relocated to Cananea in the 1860s and reopened many silver and gold mines abandoned by the Spanish. He reportedly named the mountain range the Sierra la Elenita for his wife Elena. The Sierra la Mariquita is owned by the Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE) and features the Observatorio Astrofísico Guillermo Haro (Figure 2), inaugurated in 1987 and named in honor of Mexican astronomer Guillermo Haro-Barraza (1913–1988). In 2015 the Sierra la Mariquita was designated a Voluntary Land Conservation Area in the Comisión de Áreas Naturales Protegidas federal system (Van Devender and Reina-G. 2015, Van Devender 2017). It is named for the *mariquitas* or

convergent lady beetles (*Hippodamia convergens*) that gather on its peak (Figure 3B).

Numerous collecting trips and expeditions to Sierra la Elenita–la Mariquita mountain complex have resulted in the establishment of a rich databank of plant and animal specimens and observations. Dale and Allan Zimmerman collected plants in la Mariquita in 1972, and Victor Steinmann, Michael Wilson, and Jared Shortman collected plants there in 1996. Aaron D. Flesch and Jeremy Russell recorded tree species on bird transects in la Mariquita in May–June 2009 and the Sierra la Elenita in May 2011. Madrean Archipelago Biodiversity Assessment (MABA) trips to la Mariquita in June 2009, September 2010, and August 2013 documented plants. Madrean Discovery Expedition (MDE) Sierra la Elenita documented plants in April–May 2016; other visits took place in September 2015 and August 2016. La Catalina, on the east slope of the Sierra la Elenita, was visited ten times from 2016 to 2018 by MDE. Although the results of these studies were not formally published, details about their collections and observations are available through SEINet and MABA/MDE portals.

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Figure 2. Observatorio Astrofísico Guillermo Haro on the Sierra la Mariquita. *Photo courtesy of INAOE.*



Figure 3. Southwestern white pine (*Pinus strobiformis*) in the Sierra la Mariquita. A. Branch with cones. B. Branch with needles and convergent lady beetles (*Hippodamia convergens*). *Photos by Thomas R. Van Devender.*



Figure 4. Quaking aspen (*Populus tremuloides*) in the Sierra la Mariquita. Photo by Ana Lilia Reina-G. Figure 5. Huachuca Mountain Indian paintbrush (*Castilleja patriotica*) in the Sierra la Mariquita. Photo by J. Jesús Sánchez-E.

Sierra la Elenita–la Mariquita Sky Island Complex *continued*

Flora

A total of 320 plant taxa in 65 families are recorded for Sierra la Elenita–la Mariquita complex, 207 (65%) of which have been vouchered or photographed. Dominant families are Asteraceae (55 taxa, including 2 non-natives), Poaceae (41 taxa, including 11 non-natives), Fabaceae (36 taxa, including 2 non-natives), Pteridaceae (9 taxa), Euphorbiaceae (8 taxa), Amaranthaceae (7 taxa, including one non-native), Asparagaceae (7 taxa), Brassicaceae (7 taxa, including 2 non-natives), Lamiaceae (7 taxa, including 2 non-natives), and Solanaceae (7 taxa). The most diverse genera are *Aristida* (6 taxa), *Euphorbia* (6 taxa), *Ipomoea* (6 taxa), *Brickellia* (5 taxa), *Pinus* (5 taxa), *Quercus* (5 taxa), and *Eragrostis* (4 taxa). Twenty-six species (8.1%) are non-native. The vegetative communities of this Sky Island complex include scrub grassland at the lowest elevations, oak woodland on the slopes, and pine-oak forest at the highest elevations. The summits feature regionally significant populations of southwestern white pine (*Pinus strobiformis*) (Figure 3) as well as Apache pine (*P. engelmannii*), Gambel oak (*Quercus gambelii*), and quaking aspen/álamo temblón (*Populus tremuloides*) (Figure 4). These high-elevation trees are familiar features of Arizona Sky Islands but are much rarer in Sonora. Other noteworthy

plants in the study area are mostly shared with Arizona, such as: Huachuca Mountain Indian paintbrush (*Castilleja patriotica*) (Figure 5), lesser Indian paintbrush (*C. minor* var. *minor*), Heller's draba (*Draba helleriana*) (Figure 6), Sonoran bird's-foot trefoil (*Hosackia alamosana*) (Figure 7), Wilcox nipple cactus (*Mammillaria wrightii* var. *wilcoxii*) (Figure 8), mutton grass (*Poa fendleriana*), Navajo cinquefoil (*Potentilla subviscosa* var. *ramulosa*), and ponderosa violet (*Viola umbraticola*). Perilla (*Lopezia gracilis*) is an annual member of the Onagraceae with delicate white and pink flowers (Figure 9) found in the Sierra Madre Occidental and reaching its northern distribution limit in the Sierra la Mariquita.

Although the Sierra la Mariquita is a federally-protected range, the Sierra la Elenita is entirely privately owned and

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Figure 6. Heller's draba (*Draba helleriana*). Figure 7. Sonoran bird's-foot trefoil (*Hosackia alamosana*). Photos by Susan D. Carnahan.

Sierra la Elenita–la Mariquita Sky Island Complex *continued*

faces grave threats from human activities, including mineral exploration, deforestation, tailings accumulation, and pollution. In 2014, 40 million liters (approx. 11,000 gallons) of a copper sulfate solution spilled from a Buenavista del Cobre leaching pond into the Ríos Bacanuchi and Sonora. The spill jeopardized the water source for approximately 25,000 people in seven municipalities. Guillermo Molina reports that as of May 2018 much of the east flank of the Sierra la Elenita was being actively deforested; there have been few or no biological surveys of this part of the mountain.

The Huachuca Mountains in Arizona are the sister range of the Sierra la Elenita–la Mariquita complex. Bowers and McLaughlin (1996) published the flora of the Huachucas with 994 taxa. Additional taxa from the Huachuca Mountains, discovered in floristic inventories by the Coronado National Forest and the Coronado National Memorial, are available in the SEINet databases (<http://swbiodiversity.org/seinet/collections/index.php>). A total of 281 species in Sierra la Elenita–la Mariquita flora (89.0%) are shared with the Huachuca Mountains. This similarity is not surprising considering that the northern edge of the Sierra la Mariquita is only 28 km south-southeast of Montezuma Pass. Exploration of the northern Sierra la Mariquita should increase the similarity.

The preliminary flora of the Sierra la Elenita–la Mariquita is an important contribution to our knowledge of the floristic diversity of the Sonoran Sky Islands.

Acknowledgements

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Figure 8. Wilcox nipple cactus (*Mammillaria wrightii* var. *wilcoxii*). Photo by Susan D. Carnahan. Figure 9. Perilla (*Lopezia gracilis*) in the Sierra la Mariquita. Photo by Jeff Sartain.

CHECKLIST: Sierra la Elenita–la Mariquita Sky Island Complex page 1 of 4

An asterisk (*) denotes non-native status.

Pteridophytes

DENNSTAEDTIACEAE

Pteridium aquilinum (L.) Kuhn

EQUISETACEAE

Equisetum hyemale L.

PTERIDACEAE

Argyrochosma limitanea (Maxon) Windham

Bommeria hispida (Mett. ex Kuhn) Underwood

Myriopteris aurea (Poir.) Grusz & Windham

Myriopteris fendleri (Hook.) E. Fourn.

Myriopteris lindheimeri (Hook.) J. Sm.

Myriopteris rufa Fée

Pellaea atropurpurea (L.) Link

Pellaea wrightiana Hook.

Gymnosperms

CUPRESSACEAE

Juniperus deppeana Steud.

PINACEAE

Pinus arizonica Engelm.

Pinus chihuahuana Engelm.

Pinus discolor D.K. Bailey & Hawksworth

Pinus engelmannii Carr.

Pinus strobiformis Engelm.

Eudicots

ACANTHACEAE

Dicliptera resupinata (Vahl) Juss.

Dyschoriste decumbens (A. Gray) Kuntze

AMARANTHACEAE

* *Alternanthera caracasana* Kunth

Amaranthus palmeri S. Wats.

Chenopodium arizonicum Standl.

Chenopodium neomexicanum Standl.

Dysphania graveolens (Willd.)

Mosyakin & Clemants

Gomphrena nitida Rothr.

Guilleminea densa (Humb. & Bonpl. ex Willd.) Moq.

ANACARDIACEAE

Rhus aromatica Ait.

Rhus virens Lindh. ex A. Gray var. *choriophylla* (Wooton & Standl.) L.D. Benson

Toxicodendron radicans (L.) Kuntze var. *divaricatum* (Greene) Barkl.

APIACEAE

Eryngium lemmonii J.M. Coult. & Rose

APOCYNACEAE

Apocynum androsaemifolium L.

Asclepias elata Benth.

Asclepias lemmonii A. Gray

ARALIACEAE

Aralia humilis Cav.

ASTERACEAE

Ageratina herbacea (A. Gray) R.M. King & H. Rob.

Aldama cordifolia (A. Gray) E.E. Schill. & Panero

Amauriopsis dissecta (A. Gray) Rydb.

Ambrosia confertiflora DC.

Antennaria parvifolia Nutt.

Artemisia dracunculus L.

Artemisia ludoviciana Nutt.

Baccharis salicifolia (Ruiz & Pav.) Pers.

Baccharis sarothroides A. Gray

Baccharis thesioides Kunth

Bidens pilosa L. [*B. odorata* Cav.]

Brickellia betonicifolia A. Gray

Brickellia californica (Torr. & A. Gray) A. Gray

Brickellia floribunda A. Gray

Brickellia rusbyi A. Gray

Brickellia simplex A. Gray

Carminatia tenuiflora Dc.

Carphochaete bigelovii A. Gray

Cirsium arizonicum (A. Gray) Petr.

Cirsium undulatum (Nutt.) Spreng.

Cosmos parviflorus (Jacq.) Pers.

Erigeron flagellaris A. Gray

Erigeron neomexicanus A. Gray

Galinsoga parviflora Cav.

Gutierrezia sarothrae (Pursh) Britton & Rusby

Gutierrezia wrightii A. Gray

Helianthus annuus L.

Heliopsis parvifolia A. Gray

Heterosperma pinnatum Cav.

Hieracium fendleri Sch. Bip.

Hymenothrix wrightii A. Gray

Iostephane heterophylla (Cav.) Benth.

* *Lactuca serriola* L.

Lasiantha podocephala (A. Gray) K.M. Becker

Leibnitzia lyrata (Sch. Bip.) G.L. Nesom

Melampodium longicorne A. Gray

Packera neomexicana (A. Gray) W.A. Weber & Á. Löve

Psacalium decompositum (A. Gray) H. Rob. & Brettell

Pseudognaphalium arizonicum (A. Gray) Anderb.

Pseudognaphalium leucocephalum (A. Gray) Anderb.

Roldana hartwegii (Benth.) H. Rob. & Brettell var. *carlomasonii* (B.L. Turner & T.M. Barkley) Funston

Senecio wootonii Greene

Solidago wrightii A. Gray

Stevia salicifolia Cav.

Tagetes lemmonii A. Gray

Tagetes micrantha Cav.

Tagetes minuta L.

* *Taraxacum officinale* F.H. Wigg.

Verbesina longifolia (A. Gray) A. Gray

CHECKLIST: Sierra la Elenita–la Mariquita Sky Island Complex page 2 of 4

Viguiera dentata (Cav.) Spreng.

Xanthisma gracile (Nutt.) D.R. Morgan & R.L. Hartm.

Xanthisma spinulosum (Pursh) D.R. Morgan & R.L. Hartm.

Xanthocephalum gymnospermoides (A. Gray) Benth. & Hook. f.

Zinnia grandiflora Nutt.

Zinnia peruviana (L.) L.

BIGNONIACEAE

Chilopsis linearis (Cav.) Sweet

BORAGINACEAE

Lithospermum cobrense Greene

BRASSICACEAE

* *Capsella bursa-pastoris* (L.) Medik.

Descurainia pinnata (Walter) Britton

Draba helleriana Greene

Hesperidanthus linearifolius (A. Gray) Rydb.

Noccaea fendleri (A. Gray) Holub

Pennellia longifolia (Benth.) Rollins

* *Sisymbrium irio* L.

CACTACEAE

Cylindropuntia spinosior (Engelm.) F.M. Knuth

Echinocereus fendleri (Engelm.) Sencke ex J.N. Haage

Echinocereus rigidissimus (Engelm.) Engelm. ex J.N. Haage

Echinocereus santaritensis W. Blum & Rutow

Mammillaria wrightii Engelm. var. *wilcoxii* (Toumey ex K. Schum.) W.T. Marshall

Opuntia chlorotica Engelm. & J.M. Bigelow

CAMPANULACEAE

Lobelia cardinalis L.

CARYOPHYLLACEAE

Arenaria lanuginosa (Michx.) Rohrb. subsp. *saxosa* (A. Gray) Maguire

Cerastium texanum Britton

Silene antirrhina L.

Silene laciniata Cav.

COMANDRACEAE

Comandra umbellata (L.) Nutt.

CONVOLVULACEAE

Ipomoea costellata Torr.

Ipomoea cristulata Hallier f.

Ipomoea longifolia Benth.

Ipomoea purpurea (L.) Roth

Ipomoea ternifolia Cav. var. *leptotoma* (Torr.) J.A. McDonald

Ipomoea thurberi A. Gray

Jacquemontia agrestis (Mart. ex Choisy) Meisn.

CUCURBITACEAE

Cucurbita foetidissima Kunth

ERICACEAE

Arbutus arizonica (A. Gray) Sarg.

Arctostaphylos pungens Kunth

EUPHORBIACEAE

Acalypha neomexicana Müll. Arg.

Cnidoscolus angustidens Torr.

Euphorbia chamaesula Boiss.

Euphorbia cuphosperma (Engelm.) Boiss.

Euphorbia densiflora (Klotzsch & Garcke) Klotzsch

Euphorbia heterophylla L.

Euphorbia pediculifera Engelm.

Euphorbia prostrata Aiton

Tragia nepetifolia Cav.

FABACEAE

Acaciella angustissima (Mill.) Britton & Rose

Acmispon greenei (Wooton & Standl.) Brouillet

Acmispon oroboides (Kunth) Brouillet

Aeschynomene villosa Poir.

Amorpha fruticosa L.

Astragalus nothoxys A. Gray

Astragalus nuttallianus DC.

Calliandra humilis Benth. var. *humilis*

Calliandra humilis var. *reticulata* (A. Gray) L.D. Benson

Chamaecrista nictitans (L.) Moench

Cologania angustifolia Kunth

Cologania obovata Schtdl.

Crotalaria pumila Ortega

Dalea albiflora A. Gray

Dalea filiformis A. Gray

Dalea pringlei A. Gray

Dalea versicolor Zucc.

Desmodium batocaulon A. Gray

Erythrina flabelliformis Kearney

Eysenhardtia orthocarpa (A. Gray) S. Watson

Hosackia alamosana Rose

Lathyrus graminifolius (S. Watson) T.G. White

Lupinus argenteus Pursh

Lupinus huachucanus M.E. Jones

Lupinus neomexicanus Greene

Mariosousa millefolia (S. Watson) Seigler & Ebinger

* *Medicago lupulina* L.

* *Medicago polymorpha* L.

Mimosa dysocarpa Benth.

Mimosa grahamii A. Gray

Phaseolus grayanus Wooton & Standl.

Prosopis velutina Wooton

Robinia neomexicana A. Gray

Tephrosia tenella A. Gray

Tephrosia thurberi (Rydb.) C.E. Wood

Vicia pulchella Kunth

FAGACEAE

Quercus arizonica Sarg.

Quercus emoryi Torr.

Quercus gambelii Nutt.

Quercus hypoleucoides A. Camus

Quercus oblongifolia Torr.

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GARRYACEAE

Garrya wrightii Torr.

GERANIACEAE

* *Erodium cicutarium* (L.) L'Hér. ex Ait.
Geranium caespitosum E. James
Geranium richardsonii Fisch. & Trautv.

HYDRANGEACEAE

Philadelphus microphyllus A. Gray

JUGLANDACEAE

Juglans major (Torr.) A. Heller

LAMIACEAE

Agastache pallida (Lindl.) Cory
Hedeoma dentata Torr.
* *Lamium amplexicaule* L.
* *Marrubium vulgare* L.
Monarda citriodora Cerv. ex Lag. var.
austromontana (Epling) B.L. Turner
Salvia betulifolia Epling
Stachys coccinea Ortega

LINACEAE

Linum lewisii Pursh

LYTHRACEAE

Cuphea wrightii A. Gray var. *wrightii*

MALVACEAE

Anoda cristata (L.) Schltld.
Ayenia filiformis S. Watson
Sida abutilifolia Mill.
Sphaeralcea fendleri A. Gray
Sphaeralcea incana Torr. ex A. Gray

MARTYNIACEAE

Proboscidea parviflora (Wooton)
Wooton & Standl.

MONTIACEAE

Calandrinia ciliata (Ruiz & Pav.) DC.

NYCTAGINACEAE

Boerhavia coccinea Mill.
Boerhavia erecta L.
Mirabilis albida (Walter) Heimerl

Mirabilis linearis (Pursh) Heimerl

Mirabilis longiflora L.

OLEACEAE

Fraxinus velutina Torr.

ONAGRACEAE

Lopezia gracilis S. Watson
Oenothera elata Kunth subsp.
hirsutissima (A. Gray ex S. Watson) W.
Dietr.
Oenothera podocarpa (Wooton &
Standl.) Krakos & W.L. Wagner [*Gaura*
hexandra Ortega subsp. *gracilis*
(Wooton & Standl.) P.H. Raven & D.P.
Greg]
Oenothera primiveris A. Gray
Oenothera toumeyi (Small) Tidestr.

OROBANCHACEAE

Brachystigma wrightii (A. Gray)
Pennell
Castilleja minor (A. Gray) A. Gray var.
minor
Castilleja patriotica Fernald
Castilleja tenuiflora Benth.
Conopholis alpina Liebm. var.
mexicana (A. Gray ex S. Watson) R.R.
Haynes

OXALIDACEAE

Oxalis corniculata L.
Oxalis decaphylla Kunth
Oxalis cf. *latifolia* Kunth
Oxalis metcalfei (Small) R. Knuth

PAPAVERACEAE

Argemone pleiacantha Greene
Corydalis aurea Willd.

PHRYMACEAE

Erythranthe guttata (DC.) G.L. Nesom

PLANTAGINACEAE

Nuttallanthus texanus (Scheele) D.A.
Sutton
Penstemon barbatus (Cav.) Roth
Penstemon campanulatus (Cav.)
Willd.

Penstemon parryi (A. Gray) A. Gray

Penstemon stenophyllus A. Gray

* *Plantago major* L.

PLATANACEAE

Platanus wrightii S. Watson

POLEMONIACEAE

Ipomopsis thurberi (A. Gray) V.E. Grant

POLYGALACEAE

Monnina wrightii A. Gray

POLYGONACEAE

Eriogonum abertianum Torr.
Eriogonum polycladon Benth.
Eriogonum wrightii Torr. ex Benth.
* *Polygonum aviculare* L.
* *Rumex crispus* L.

PORTULACACEAE

* *Portulaca oleracea* L.

RANUNCULACEAE

Aquilegia chrysantha A. Gray
Thalictrum fendleri Engelm. ex A. Gray
RHAMNACEAE
Ceanothus buxifolius Willd. ex Schult.
f.
Frangula betulifolia (Greene) Grubov

ROSACEAE

Cercocarpus montanus Raf. var.
paucidentatus (S. Watson) F.L. Martin
Holodiscus discolor (Pursh) Maxim.
Potentilla subviscosa Greene var.
ramulosa (Rydb.) Kearney & Peebles
Prunus serotina Ehrh. var. *virens*
(Wooton & Standl.) McVaugh

RUBIACEAE

Bouvardia ternifolia (Cav.) Schltld.
Galium microphyllum A. Gray

SALICACEAE

Populus fremontii S. Watson
Populus tremuloides Michx.
Salix bonplandiana Kunth

CHECKLIST: Sierra la Elenita–la Mariquita Sky Island Complex page 4 of 4

Salix exigua Nutt.

SAXIFRAGACEAE

Heuchera sanguinea Engelm.

SIMAROUBACEAE

* *Ailanthus altissima* (Mill.) Swingle

SOLANACEAE

Calibrachoa parviflora (Juss.) D'Arcy

Datura inoxia Mill.

Physalis caudella Standl.

Physalis hederifolia A. Gray

Physalis pubescens L.

Solanum elaeagnifolium Cav.

Solanum fendleri A. Gray

VERBENACEAE

Aloysia gratissima (Gillies & Hook.)
Tronc.

Glandularia chiricahensis Umber

Glandularia gooddingii (Briq.) Solbrig

Glandularia latilobata (L.M. Perry)
G.L. Nesom

VIOLACEAE

Viola umbraticola Kunth

VITACEAE

Vitis arizonica Engelm.

Monocots

AMARYLLIDACEAE

Allium plummerae S. Watson

ASPARAGACEAE

Agave palmeri Engelm.

Agave parryi Engelm. var.
huachucensis (Baker) Little

Dasyllirion wheeleri S. Watson ex
Rothr.

Echeandia flavescens (Schult. &
Schult. f.) Cruden

Milla biflora Cav.

Nolina microcarpa S. Watson

Yucca madrensis Gentry

COMMELINACEAE

Commelina dianthifolia Delile

Commelina erecta L.

Tradescantia pinetorum Greene

CYPERACEAE

Carex praegracilis W. Boott

Cyperus fendlerianus Boeckl.

Cyperus pallidicolor (Kük.) G.C. Tucker

Cyperus sphaerolepis Boeckl.

Cyperus squarrosus L.

Eleocharis montevidensis Kunth

JUNCACEAE

Juncus mexicanus Willd. ex Schult. &
Schult. f.

Juncus saximontanus A. Nelson

POACEAE

Aristida adscensionis L.

Aristida havardii Vasey

Aristida pansa Wooton & Standl.

Aristida schiedeana Trin. & Rupr. var.
orcuttiana (Vasey) Allred & Valdés-
Reyna

Aristida ternipes Cav. var. *gentilis*
(Henrard) Allred

Aristida ternipes Cav. var. *ternipes*

* *Avena fatua* L.

Blepharoneuron tricholepis (Torr.)
Nash

Bothriochloa barbinodis (Lag.) Herter

Bouteloua curtipendula (Michx.) Torr.

Bouteloua hirsuta Lag.

Bouteloua repens (Kunth) Scribn. &
Merr.

* *Bromus catharticus* Vahl

Bromus inermis Leyss.

Chloris virgata Sw.

* *Cynodon dactylon* (L.) Pers.

Dasyochloa pulchella (Kunth) Willd. ex
Rydb.

Disakisperma dubium (Kunth) P.M.
Peterson & N. Snow

* *Echinochloa crus-galli* (L.) P. Beauv.

Elymus arizonicus (Scribn. & J.G. Sm.)
Gould

Elymus elymoides (Raf.) Swezey

* *Eragrostis cilianensis* (All.) Vignolo ex
Janch.

Eragrostis intermedia Hitchc.

* *Eragrostis lehmanniana* Nees

Eragrostis mexicana (Hornem.) Link

Heteropogon contortus (L.) Beauv. ex
Roem. & Schult.

Koeleria pyramidata (Lam.) P. Beauv

* *Melinis repens* (Willd.) Zizka

Muhlenbergia alopecuroides (Griseb.)
P.M. Peterson & Columbus

Muhlenbergia emersleyi Vasey

Muhlenbergia longiligula Hitchc.

Muhlenbergia rigens (Benth.) Hitchc.

* *Pennisetum ciliare* (L.) Link

Piptochaetium fimbriatum (Kunth)
Hitchc.

* *Poa annua* L.

Poa fendleriana (Steud.) Vasey

* *Polypogon viridis* (Gouan) Breistr.

Setaria liebmannii E. Fourn.

* *Sorghum halepense* (L.) Pers.

Sporobolus wrightii Munro ex Scribn.

Zuloagaea bulbosa (Kunth) E. Bess