

Great Sand Dunes National Monument and Preserve Vascular Plant Inventory



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Knowledge to Go Places

I. Background

As part of its biological inventory program, the National Park Service (NPS) contracted the Colorado Natural Heritage Program (CNHP) in 2001-2002 to conduct a field inventory of vascular plants of Great Sand Dunes National Monument and Preserve (GRSA). In 2001 the Rocky Mountain Network of the NPS developed a study plan for biological inventories for parks in the Network. Although detailed botanical research had been conducted in GRSA by H.N. Dixon (1999) and others, additional research was needed, particularly regarding the distribution of high elevation, rare, and non-native plants. The Network in cooperation with CNHP submitted a Biological Inventory Study Plan to the NPS Inventory and Monitoring Program, which was approved. That Plan provides detailed information and guidance for biological inventories in all Rocky Mountain Network parks.

The checklist of vascular plants of Great Sand Dunes National Monument (Dixon 1999) was developed over a 30-year period from 1969-1999, and documents about 406 taxa that occur in the Monument. This is one of the most thorough botanical inventories in all of Colorado. Given the thoroughness of this inventory, the checklist is considered to be comprehensive for the Monument. Although, many of the species on the checklist are not represented in the GRSA Herbarium, many voucher specimens are housed at the Alamosa State College Herbarium (pers. comm. Dixon 2002).

On November 22, 2000, the boundaries of the Great Sand Dunes National Monument were expanded to include the Great Sand Dunes Preserve. The new boundaries encompass an additional 42,000 acres, a far greater elevation range, including six peaks over 13,000 feet, and additional habitats, including both alpine and sub-alpine areas. Many of the species in the Preserve are not included on the Monument checklist, nor are they represented in the Monument Herbarium.

There are four plant species documented as occurring in GRSA that are considered to be rare in Colorado (Colorado Natural Heritage Program 2002).

II. Objectives

- Compile and review existing botanical data for GRSA.
- Document additional occurrence and distribution information for vascular plants at GRSA.
- Objectively quantify inventory completeness for plants surveyed at GRSA.

III. Methods

CNHP staff worked with GRSA staff, particularly Fred Bunch, beginning in fall 2001, to plan and implement the project. This included scheduling site visits, permitting, compliance, and logistical assistance from park staff.

Our methods can be characterized as a standard floristic survey, following methods employed by Colorado botanists in numerous similar studies (e.g., Maley 1994, Clark 1996, Freeman 2000). The surveys were based on subjective searches of a representation of all habitats, with the intent that as many as possible previously undocumented species within the Monument would be located and identified.

In an effort to determine specific places to target for our research we referred to geology (ArcView coverage provided by Monument staff), soil (ArcView coverage provided by Monument staff), vegetation (ArcView coverage provided by Monument staff), and topographic (USGS 7.5 minute quadrangle) maps to look for areas in the Monument and Preserve that may support unusual habitats and therefore previously undocumented plants. In an effort to determine specific species to target for our research we referred to the master plant list for the Monument Herbarium (provided by Fred Bunch 2002), the University of Colorado Herbarium lists of plant species for Saguache and Alamosa counties (University of Colorado Museum 2002), the Colorado Natural Heritage Program lists of rare plant species for Saguache and Alamosa counties (Colorado Natural Heritage Program 2002), and the Colorado Department of Agriculture list of noxious weeds (Colorado Department of Agriculture 2000).

Field surveys were completed June 25-September 11, 2002. We subjectively searched areas and habitats distributing survey effort across the entire Preserve, with less effort given to the Monument area, as requested by GRSA staff. We carried a vouched plant species list for the Monument, and took voucher specimens when appropriate. A map showing all collection points is presented in Appendix 1.

We recorded hours spent surveying (as an estimate of survey effort) and survey locations and compared these data with survey results and the master species list to estimate survey completeness.

Species that were found to be new to the Monument Herbarium were entered into the National Park Service Standard Collection Spreadsheet and delivered to David Pillmore, NPS Inventory and Monitoring Computer Technician at David_Pillmore@nps.gov. Nomenclature follows that of Kartesz (1999) as modified by the PLANTS Database (USDA, NRCS 2002).

IV. Results

We spent a total of 20 person-days (approximately 116 person-hours plus travel time) surveying Great Sands Dunes National Monument and Preserve during June-September of 2002. We were able to identify many species in the field, and collected 196 specimens either because they required further verification, or because we believed that a voucher specimen had not been collected for the GRSA Herbarium.

We identified all of the specimens and verified 111 plant species from GRSA that had not previously been documented with voucher specimens at the GRSA Herbarium (Table 1). Two of the newly vouched taxa are considered to be rare in Colorado (*Draba smithii* (Smith's draba) and *Cryptantha cinerea* var. *pustulosa* (James catseye), Colorado Natural Heritage Program 2002). Although these taxa were previously known from the Monument and documented with specimens

at other herbaria, they were not included in the GRSA collection. Four of the taxa are not native to Colorado (*Chenopodium album* (lambsquarters), *Euphorbia esula* var. *esula* (leafy spurge), *Bromus carinatus* (mountain brome), and *Bromus inermis* (smooth brome, Weber and Wittmann 2001), and among these, one is included on the state list of noxious weeds, *Euphorbia esula* var. *esula* (leafy spurge, Colorado Department of Agriculture 2000).

Table 1. Plant species collected in Great Sand Dunes National Monument and Preserve (GRSA) by Spackman and Decker in 2002 that had not previously been documented with voucher specimens at the GRSA Herbarium. Species are listed in alphabetical order by family. Species listed in bold are rare in Colorado (Colorado Natural Heritage Program 2002). Species not native to Colorado are indicated under comments. Species that are also listed on the Monument checklist (Dixon 1999) are indicated with an asterisk preceding the Latin name. Nomenclature follows that of Kartesz (1999) as modified by the PLANTS Database (USDA, NRCS 2002). Where nomenclature differs from that of Weber and Wittmann (2001), the synonym is listed under comments.

Family	Latin Name	Common Name	Comments
Apiaceae	<i>Angelica grayi</i> (Coult. & Rose) Coult. & Rose	Gray's angelica	
Apiaceae	<i>Osmorhiza depauperata</i> Phil.	blunt-fruit sweet-cicely, bluntseed sweetroot	
Apiaceae	* <i>Pseudocymopterus montanus</i> (Gray) Coult. & Rose	alpine false springparsley, anise, false springparsley	
Asteraceae	<i>Antennaria umbrinella</i> Rydb.	brown everlasting, umber pussytoes	
Asteraceae	<i>Arnica cordifolia</i> Hook.	heartleaf arnica	
Asteraceae	<i>Arnica mollis</i> Hook.	hairy arnica, wooly arnica	
Asteraceae	<i>Artemisia campestris</i> var. <i>borealis</i> (Pallas) M.E. Peck	field sagewort	Weber and Wittmann 2001: <i>Oligosporus groenlandicus</i> (Hornem.) A.& D. Löve
Asteraceae	<i>Artemisia scopulorum</i> Gray	alpine sagebrush, dwarf sagebrush	
Asteraceae	* <i>Cirsium canescens</i> Nutt.	Platte thistle, prairie thistle	
Asteraceae	<i>Erigeron elatior</i> (Gray) Greene	tall fleabane	
Asteraceae	<i>Erigeron melanocephalus</i> (A. Nels.) A. Nels.	blackhead fleabane	

Family	Latin Name	Common Name	Comments
Asteraceae	<i>Erigeron pinnatisectus</i> (Gray) A. Nels.	featherleaf fleabane	
Asteraceae	<i>Heterotheca canescens</i> (DC.) Shinnars	gray goldaster, hoary false goldenaster	
Asteraceae	<i>Hymenoxys hoopesii</i> (Gray) Bierner	orange sneezeweed, owl's-claws, sneezeweed	Weber and Wittmann 2001: <i>Dugaldia hoopesii</i> (Gray) Rydb.
Asteraceae	<i>Oreochrysum parryi</i> (Gray) Rydb.	Parry's goldenrod	
Asteraceae	<i>Senecio atratus</i> Greene	tall blacktip ragwort	
Asteraceae	<i>Senecio spartioides</i> var. <i>multicapitatus</i> (Greenm. ex Rydb.) Welsh	broomlike ragwort, many-head ragwort, ragwort groundsel	Weber and Wittmann 2001: <i>Senecio multicapitatus</i> Greenman
Asteraceae	<i>Senecio triangularis</i> Hook.	arrowleaf groundsel, arrowleaf ragwort	
Asteraceae	<i>Solidago nana</i> Nutt.	baby goldenrod, gray goldenrod	Weber and Wittmann 2001: <i>Solidago simplex</i> var. <i>nana</i> (Gray) Ringius
Asteraceae	<i>Tetranneuris acaulis</i> var. <i>caespitosa</i> A. Nels.	caespitose four-nerve daisy, caespitose hymenoxys	Weber and Wittmann 2001: <i>Tetranneuris brevifolia</i> Greene
Boraginaceae	*<i>Cryptantha cinerea</i> var. <i>pustulosa</i> (Rydb.) Higgins	James catseye, James' cryptantha	Weber and Wittmann 2001: <i>Oreocarya putsulosa</i> Rydberg
Brassicaceae	<i>Draba smithii</i> Gilg ex O.E. Schulz	Smith's draba	
Brassicaceae	<i>Draba streptocarpa</i> Gray	pretty draba, pretty whitlowgrass	
Brassicaceae	<i>*Erysimum capitatum</i> (Dougl. ex Hook.) Greene	western wallflower	
Caryophyllaceae	<i>*Arenaria fendleri</i> var. <i>fendleri</i> Gray	Fendler sandwort, Fendler's sandwort	Weber and Wittmann 2001: <i>Eremogone fendleri</i> (Gray) S. Ikonnikov
Caryophyllaceae	<i>Cerastium fontanum</i> Baumg.	common chickweed, common mouse-ear chickweed, mouse-ear chickweed	

Family	Latin Name	Common Name	Comments
Caryophyllaceae	<i>Silene acaulis</i> var. <i>subacaulescens</i> (F.N. Williams) Fern. & St. John	moss campion, moss catchfly	Weber and Wittmann 2001: <i>Silene acaulis</i> ssp. <i>subacaulescens</i> (Williams) Hitchcock & Maguire
Caryophyllaceae	<i>Stellaria crassifolia</i> Ehrh.	fleshy starwort, thickleaved chickweed	
Chenopodiaceae	* <i>Chenopodium album</i> L.	common lambsquarters, lambsquarters, lambsquarters goosefoot, white goosefoot	Non-native
Crassulaceae	<i>Rhodiola rhodantha</i> (Gray) Jacobsen	redpod stonecrop	Weber and Wittmann 2001: <i>Clementsia rhodantha</i> (Gray) Rose
Cyperaceae	<i>Carex albonigra</i> Mackenzie	black-and-white sedge	
Cyperaceae	<i>Carex aquatilis</i> Wahlenb.	water sedge	
Cyperaceae	<i>Carex bella</i> Bailey	showy sedge, southwestern showy sedge	
Cyperaceae	<i>Carex ebenea</i> Rydb.	ebony sedge	
Cyperaceae	<i>Carex nova</i> Bailey	black sedge, new sedge	
Cyperaceae	<i>Carex pellita</i> Muhl ex Willd.	woolly sedge	Weber and Wittmann 2001: <i>Carex lanuginosa</i> Michx.
Cyperaceae	<i>Carex scopulorum</i> Holm	Holm's Rocky Mountain sedge, mountain sedge	
Cyperaceae	<i>Carex utriculata</i> Boott	beaked sedge, Northwest Territory sedge	
Cyperaceae	<i>Eriophorum angustifolium</i> Honckeney	narrowleaf cottonsedge, tall cottongrass	
Cyperaceae	* <i>Scirpus microcarpus</i> J.& K. Presl	panicled bulrush, red-tinge bulrush, smallfruit bulrush	
Elaeagnaceae	<i>Shepherdia canadensis</i> (L.) Nutt.	russet buffaloberry	
Euphorbiaceae	<i>Euphorbia esula</i> var. <i>esula</i> L.	leafy spurge, spurge, wolf's milk, wolf's-milk	Weber and Wittmann 2001: <i>Tithymalus esula</i> (L.) Hill, Non-native, listed on Colorado's top 10 noxious weed list
Fabaceae	<i>Astragalus alpinus</i> L.	alpine milkvetch	
Fabaceae	<i>Lupinus argenteus</i> Pursh	silvery lupine	

Family	Latin Name	Common Name	Comments
Fabaceae	<i>Trifolium dasyphyllum</i> Torr. & Gray	alpine clover, whiproot clover	
Gentianaceae	<i>Frasera speciosa</i> Dougl. ex Griseb.	deer ears, elkweed, green gentian, monument plant, showy fraseria	
Gentianaceae	<i>Gentiana algida</i> Pallas	whitish gentian	Weber and Wittmann 2001: <i>Gentianodes algida</i> (Pallas) A. & D. Löve
Gentianaceae	<i>Swertia perennis</i> L.	alpinebog swertia, felwort, star gentian	
Grossulariaceae	<i>Ribes montigenum</i> McClatchie	alpine prickly currant, gooseberry currant, mountain gooseberry	
Hydrophyllaceae	<i>Phacelia sericea</i> (Graham) Gray	purplefringe, silky phacelia	
Juncaceae	<i>Juncus longistylis</i> Torr.	longstyle rush	
Juncaceae	<i>Juncus mertensianus</i> Bong.	Merten's rush, Mertens rush, Mertens' rush	
Juncaceae	<i>Luzula parviflora</i> (Ehrh.) Desv.	millet woodrush, smallflowered woodrush	
Lamiaceae	* <i>Prunella vulgaris</i> L.	common selfheal, heal all, selfheal	
Liliaceae	<i>Allium geyeri</i> S. Wats.	Geyer's onion	
Liliaceae	<i>Streptopus amplexifolius</i> var. <i>chalmazatus</i> Fassett	tubercle twistedstalk	Weber and Wittmann 2001: <i>Streptopus fassettii</i>
Liliaceae	<i>Zigadenus elegans</i> ssp. <i>elegans</i> Pursh	mountain deathcamas	Weber and Wittmann 2001: <i>Anticlea elegans</i> (Pursh) Rydb.
Onagraceae	* <i>Epilobium hornemannii</i> Reichenb.	Hornemann's willowherb	
Onagraceae	<i>Oenothera elata</i> ssp. <i>hirsutissima</i> (Gray ex S. Wats.) W. Dietr.	Hooker evening primrose	
Orchidaceae	<i>Spiranthes romanzoffiana</i> Cham.	hooded ladies'-tresses, hooded ladiestresses, hooded lady's tresses	

Family	Latin Name	Common Name	Comments
Pinaceae	<i>Picea engelmannii</i> Parry ex Engelm.	Engelmann spruce, Engelmann's spruce, mountain spruce, silver spruce, white spruce	
Pinaceae	* <i>Pinus aristata</i> Engelm.	bristlecone pine, foxtail pine, hickory pine	
Poaceae	* <i>Aristida purpurea</i> Nutt.	purple 3-awn, purple three-awn, red threeawn	
Poaceae	<i>Bromus carinatus</i> Hook. & Arn.	California brome, mountain brome	Weber and Wittmann 2001: <i>Ceratochloa carinata</i> (Hook. & Arn.) Tutin, Non-native
Poaceae	<i>Bromus inermis</i> Leyss.	awnless brome, smooth brome	Weber and Wittmann 2001: <i>Bromopsis inermis</i> (Leysser) Holub, Non-native
Poaceae	<i>Bromus inermis</i> var. <i>pumpellianus</i> (Scribn.) C.L. Hitchc.	Pumpelly's brome	Weber and Wittmann 2001: <i>Bromopsis pumpelliana</i> (Scribn.) Holub
Poaceae	* <i>Calamagrostis canadensis</i> (Michx.) Beauv.	bluejoint, bluejoint reedgrass	
Poaceae	<i>Danthonia intermedia</i> Vasey	timber oatgrass	
Poaceae	<i>Danthonia parryi</i> Scribn.	Parry's oatgrass	
Poaceae	<i>Deschampsia caespitosa</i> (L.) Beauv.	tufted hairgrass	
Poaceae	<i>Elymus scribneri</i> (Vasey) M.E. Jones	Scribner's wild rye, spreading wheatgrass	
Poaceae	<i>Elymus trachycaulus</i> (Link) Gould ex Shinnars	slender wheatgrass, slender wild rye	
Poaceae	<i>Festuca thurberi</i> Vasey	Thurber fescue, Thurber's fescue	
Poaceae	<i>Phleum alpinum</i> L.	alpine timothy	Weber and Wittmann 2001: <i>Phleum commutatum</i> Gaudin
Poaceae	<i>Poa glauca</i> ssp. <i>rupicola</i> (Nash ex Rydb.) W.A. Weber	timberline bluegrass	

Family	Latin Name	Common Name	Comments
Poaceae	<i>Poa nemoralis</i> ssp. <i>interior</i> (Rydb.) W.A. Weber	inland bluegrass	
Poaceae	* <i>Redfieldia flexuosa</i> (Thurb.) Vasey	blowout grass	
Poaceae	* <i>Trisetum spicatum</i> (L.) Richter	spike trisetum	Weber and Wittmann 2001: <i>Trisetum spicatum</i> ssp. <i>congdonii</i> (Scribn. & Merr.) Hultén
Polemoniaceae	<i>Phlox condensata</i> (Gray) E. Nels.	dwarf phlox	
Polemoniaceae	<i>Polemonium pulcherrimum</i> ssp. <i>delicatum</i> (Rydb.) Brand	beautiful jacob's ladder, Jacob's-ladder, skunkweed Jacob's-ladder	
Polemoniaceae	<i>Polemonium viscosum</i> Nutt.	sticky Jacob's-ladder, sticky polemonium	
Polygonaceae	<i>Eriogonum flavum</i> Nutt.	alpine golden buckwheat, yellow eriogonum	Weber and Wittmann 2001: <i>Eriogonum flavum</i> ssp. <i>chloranthum</i> (Greene) Stokes
Polygonaceae	<i>Polygonum bistortoides</i> Pursh	American bistort	Weber and Wittmann 2001: <i>Bistorta bistortoides</i> (Pursh) Small
Polygonaceae	<i>Polygonum viviparum</i> L.	alpine bistort, serpent-grass, viviparous bistort	Weber and Wittmann 2001: <i>Bistorta vivipara</i> (L.) S. Gray
Pteridaceae	<i>Argyrochosma fendleri</i> (Kunze) Windham	Fendler's false cloak fern	
Pteridaceae	<i>Cryptogramma acrostichoides</i> R. Br.	American rockbrake	
Pyrolaceae	<i>Moneses uniflora</i> (L.) Gray	single delight	
Ranunculaceae	<i>Aconitum columbianum</i> Nutt.	Columbia monkshood	
Ranunculaceae	<i>Actaea rubra</i> ssp. <i>arguta</i> (Nutt.) Hultén	red baneberry	
Ranunculaceae	<i>Aquilegia caerulea</i> James	Colorado blue columbine	Weber and Wittmann 2001: <i>Aquilegia coerulea</i> James

Family	Latin Name	Common Name	Comments
Ranunculaceae	<i>Caltha leptosepala</i> DC.	white marsh marigold	Weber and Wittmann 2001: <i>Psychrophila leptosepala</i> (DC.) W.A. Weber
Ranunculaceae	<i>Delphinium barbeyi</i> (Huth) Huth	Barbey larkspur, subalpine larkspur, tall larkspur	
Ranunculaceae	* <i>Thalictrum fendleri</i> Engelm. ex Gray	Fendler meadowrue	
Rosaceae	<i>Dasiphora floribunda</i> (Pursh) Kartesz	shrubby cinquefoil	Weber and Wittmann 2001: <i>Pentaphylloides floribunda</i> (Pursh) A. Löve
Rosaceae	<i>Dryas octopetala</i> ssp. <i>hookeriana</i> (Juz.) Hultén	Hooker's mountain-avens	
Rosaceae	<i>Geum rossii</i> var. <i>turbinatum</i> (Rydb.) C.L. Hitchc.	Ross avens	Weber and Wittmann 2001: <i>Acomastylis rossii</i> ssp. <i>turbinata</i> (Rydb.) W.A. Weber
Rubiaceae	<i>Galium triflorum</i> Michx.	fragrant bedstraw, sweet bedstraw, sweetscented bedstraw	
Salicaceae	<i>Salix brachycarpa</i> Nutt.	barrenground willow, shortfruit willow	
Salicaceae	<i>Salix nivalis</i> Hook.	snow willow	
Salicaceae	<i>Salix petrophila</i> Rydb.	alpine willow	
Salicaceae	<i>Salix planifolia</i> Pursh	diamondleaf willow, plainleaf willow, tea-leaf willow	
Saxifragaceae	<i>Saxifraga bronchialis</i> ssp. <i>austromontana</i> (Wieg.) Piper	matted saxifrage	Weber and Wittmann 2001: <i>Ciliaria austromontana</i> (Wieg.) W.A. Weber
Saxifragaceae	<i>Saxifraga odontoloma</i> Piper	brook saxifrage, streambank saxifrage	Weber and Wittmann 2001: <i>Micranthes odontoloma</i> (Piper) W.A. Weber
Scrophulariaceae	<i>Castilleja haydenii</i> (Gray) Cockerell	Hayden's Indian paintbrush	
Scrophulariaceae	<i>Castilleja occidentalis</i> Torr.	western Indian paintbrush	
Scrophulariaceae	<i>Castilleja rhexiifolia</i> Rydb.	rhexialeaf paintbrush, splitleaf Indian paintbrush	

Family	Latin Name	Common Name	Comments
Scrophulariaceae	<i>Pedicularis groenlandica</i> Retz.	bull elephant's-head, elephanthead lousewort	
Scrophulariaceae	<i>Pedicularis parryi</i> Gray	Parry cinchweed, Parry's lousewort	
Scrophulariaceae	<i>Penstemon hallii</i> Gray	Hall's beardtongue	
Scrophulariaceae	<i>Penstemon whippleanus</i> Gray	dark beardtongue, Whipple's penstemon	
Scrophulariaceae	<i>Veronica wormskjoldii</i> Roemer & J.A. Schultes	American alpine speedwell	Weber and Wittmann 2001: <i>Veronica nutans</i> Bongard

Plant families with the most species new to the GRSA Herbarium included Asteraceae (17 new), Poaceae (16 new), Cyperaceae (10 new), Scrophulariaceae (8 new), and Ranunculaceae (6 new). These families are also some of the largest families for all of Colorado's plants.

During the approximately 116 hours we spent surveying the vascular flora of GRSA, we attempted to divide our time evenly between different habitat types and elevations found in the Preserve area. However, given the difficulty of accessing the alpine and sub-alpine, we spent less time in these areas. Approximate time spent in each habitat and elevation range, and number of new species found is presented in Table 2. Although we spent less time at higher elevations, more species new to the GRSA Herbarium were found in the alpine and sub-alpine areas than the low elevations. The low elevation habitats have species compositions that are similar to the rest of the Monument that had been more thoroughly inventoried in the past (Dixon 1999).

A total of 128 specimens (including voucher specimens for the 111 species listed in Table 1) will be deposited at the Great Sand Dunes National Monument Herbarium. Copies of all of the specimen labels are presented in Appendix 2. These data are also tabulated in the NPS standard voucher specimen collection spreadsheet which includes the following information: Latin name, date of collection, observer, habitat, elevation, accession number, collection number, specimens location, collection location, and comments regarding taxonomic synonyms.

Table 2. Number of newly vouched plant species and hours spent at different habitats/elevations in Great Sand Dunes National Monument and Preserve.

Habitat	Approximate elevation	Time spent (estimate of survey effort)	Number of newly vouched plant species
Montane: Pinyon-Juniper woodlands, Aspen groves, Shrublands, Riparian areas, Sand Dunes, Grasslands, Ruderal areas.	8,000-10,000 feet	50 hours	22 species (8 of these are listed on Dixon's 1999 checklist)
Subalpine: Spruce-Fir forests, Riparian areas, Grasslands, Ruderal areas.	10,000-11,500 feet	38 hours	42 species (5 of these are listed on Dixon's 1999 checklist)
Alpine: Cushion plant communities, Grasslands, Talus, Wetlands, Ruderal areas.	11,500-13,000 feet	28 hours	47 species (2 of these are listed on Dixon's 1999 checklist)

V. Discussion

The spring and summer of 2002 brought one of the driest years on record for Colorado. The Monument was so dry that many plants were not flowering or sporulating when they usually would be during a non-drought year. It is likely that more species would be found in a non-drought year.

Regardless of the drought, the results of our 2002 inventory suggest that there are many more vascular plant species to document throughout the GRSA. In approximately 116 person hours we documented 111 plant species that were not previously represented at the GRSA Herbarium. Many of the newly documented taxa are extremely common in this part of Colorado such as *Picea engelmannii* (Engelmann spruce), *Arnica cordifolia* (heartleaf arnica), *Senecio triangularis* (arrowleaf groundsel), and *Carex aquatilis* (water sedge). Most of the newly vouched species were found at high elevations in the Preserve. Presumably, the plant species inventory completeness for GRSA decreases with increasing elevation. This is undoubtedly because the Preserve now includes alpine and sub-alpine habitats that were not found within the original Monument boundaries.

VI. Recommendations

An updated checklist for GRSA, including the newly established Preserve area, would benefit GRSA managers and provide visitors with a more complete list of all of the plants species known from the Monument and Preserve.

It is extremely likely that future surveys will find more plant species at GRSA. In particular, an intensive survey for rare species, such as *Astragalus bodinii* (Bodin's milkvetch), *Draba grayana* (Gray's draba), *D. fladnizensis* (arctic draba), and *Platanthera sparsiflora* var. *ensifolia* (canyon bog orchid), during a non-drought year could identify new species for the Monument. More intensive rare species surveys could also identify additional populations of rare plants already known from the Monument such as *Draba smithii* (Smith's draba, listed in Table 1), *Cryptantha cinerea* var. *pustulosa* (James catseye, listed in Table 1), *Cleome multicaulis* (slender spiderflower, included on the Monument checklist (Dixon 1999)) and *Woodsia neomexicana* (New Mexico Cliff Fern, specimen housed at the University of Colorado Herbarium (Colorado Natural Heritage Program 2002)).

In particular, further inventory work is recommended to verify the specific locations of *Woodsia neomexicana* (New Mexico cliff fern). This species was documented in the Monument in the Mosca Creek drainage in 1954 (Colorado Natural Heritage Program 2002, Appendix 3), but has not been observed there or at any other location in the Monument since that time. We observed two other fern species in the Mosca Creek drainage in 2002, but did not locate any of the New Mexico cliff fern. Again, this may be because of the severe drought conditions during 2002. *Potentilla ambigens* (silky leaf cinquefoil) is another rare species that warrants further inventory attention. This species was collected and identified by H.N. Dixon in 1984, but Dixon indicates that this record should probably be checked for accuracy (pers. comm. Dixon 2002).

To help assure the long-term protection of the biodiversity of GRSA, specific management for the protection of the locations that are known to support rare plant species would be an effective step. *Draba smithii* (Smith's draba) is a globally imperiled species that is only known from 16 locations in Colorado, and nowhere else in the world, which points of the significance of the two locations of this species at GRSA (Colorado Natural Heritage Program 2002, Appendix 3). *Cleome multicaulis* (slender spiderflower) is also globally rare, and is known from one location in GRSA (Colorado Natural Heritage Program 2002, Appendix 3). Although the slender spiderflower is also known from a fairly wide range continuing south into Mexico, the most vigorous populations known are found in the San Luis Valley of Colorado (Colorado Natural Heritage Program 2002). *Cryptantha cinerea* var. *pustulosa* (James catseye) is another rare species that is known from three locations at GRSA (Colorado Natural Heritage Program 2002, Appendix 3). This species is also known from New Mexico, Arizona, and Utah, but its status in the other states is not known. In Colorado, the James catseye is known from a total of four locations, and three of these are in the Great Sand Dunes National Monument. Monitoring the known populations of these species for any changes to the overall size, quality, and condition would help assure their long-term protection at GRSA.

Annual surveys targeting non-native invasive species would also be an important step toward protecting the natural resources of GRSA. Early detection of non-natives is one of the most cost effective and ecologically sensible defensive actions that land managers can take to manage and control weedy invaders (Colorado Department of Agriculture 2001). Numerous species that are not native to Colorado have been documented in GRSA (Dixon 1999, current study). Although all of these non-native species could present challenges, the following are of particular concern because they are known to be quite invasive and difficult to control: *Cirsium arvense* (Canada

thistle), *Convolvulus arvensis* (field bindweed), *Euphorbia esula* var. *esula* (leafy spurge), *Melilotus officinalis* (yellow sweetclover), and *Bromus tectorum* (cheatgrass) (Whitson et al. 2000, Colorado Department of Agriculture 2000). These and other potentially troublesome weeds would likely arrive via roadways into the Monument and Preserve, and would likely be carried by cars, horses, and human foot traffic. Several non-natives were noted just outside of GRSA on the east side of Medano Pass.

Finally, although the vascular flora of GRSA has now been fairly well documented, the nonvascular flora remains poorly understood. Nonvascular species, particularly lichens, are highly sensitive biological indicators of environmental change and quality (McCune et al. 1998, St. Clair 1999). Thus, an assessment of the species richness and distribution of lichens, mosses and liverworts would provide GRSA with a powerful tool for monitoring the biological integrity of the area by establishing a baseline for future assessment.

CNHP Personnel

Botany Team Leader, Susan Spackman Panjabi: principal investigator and coordination of vascular plant inventory

Ecologist, Karin Decker: assist with field research, plant identification, GIS analyses, and map production

Science Information Manager, Jill Handwerk: responsible for input of data, and data queries from CNHP databases

Database Manager, Alison Loar: maintenance of databases, quality assurance of data entered in from the project, technical assistance to the botanists

GIS Specialist, Amy Lavender: quality assurance of data entered in from the project, GIS analyses

Botany Volunteer, Marisa Bunning: responsible for data entry and herbarium label production.

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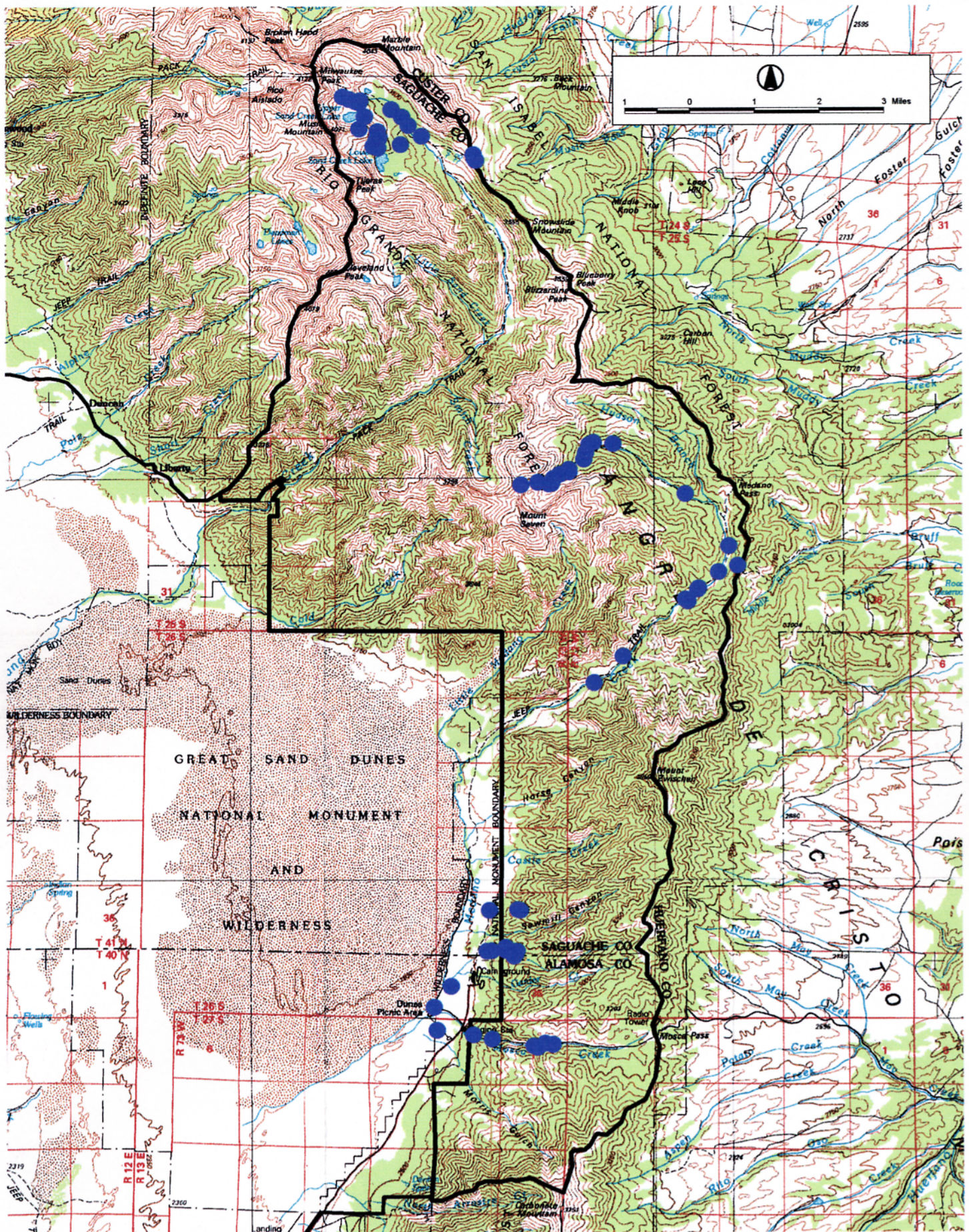
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Appendix 1

Map showing collection locations of voucher specimens collected by Spackman and Decker in 2002.



Appendix 1:
Great Sand Dunes National Monument and Preserve
2002 Collection points

Appendix 2

Specimen labels for voucher specimens deposited at the Great Sand Dunes National Monument Herbarium by Spackman and Decker 2002. Four species were not new to the GRSA Herbarium; therefore, they are not listed in Table 1.

Plants of Colorado

Saguache County

Boraginaceae

Det. by: S. Spackman

Cryptantha cinerea

var. pustulosa (Rydb) Higgins

Great Sand Dunes National Park, Medano Pass Road, just south of where road drops into Medano Creek drainage. Growing in sand.

With: Chrysothamnus, Achnatherum hymenoides, Artemisia frigida, Opuntia, Yucca

Flower color: white

Elevation: 8368 ft.

USGS Quadrangle: Liberty

UTM: Zone 13, E0455904, N4179226, NAD 27

S. Spackman & K. Decker SS02-01

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Heliomeris multiflora Nuttall

Great Sand Dunes Preserve, Mosca Pass Trail.

USGS Quadrangle: Mosca Pass

S. Spackman & K. Decker SS02-03

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pteridaceae

Det. by: S. Spackman

Argyrochosma fendleri (Kunze) Windham

Great Sand Dunes Preserve. Growing on rock cliffs.

With: Prunus, Opuntia.

Elevation: 9086 ft.

USGS Quadrangle: Mosca Pass

UTM: Zone 13, E457000, N4175858, NAD 27

S. Spackman & K. Decker SS02-08

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pteridaceae

Det. by: S. Spackman

Argyrochosma fendleri Kunze

Great Sand Dunes Preserve, Mosca Pass Trail, at upper junction of Mosca Pass Trail and Nature Trail - plants continue up trail for one mile or more. Growing on cliffs of metamorphic rocks, south facing.

With: Pinus edulis, Juniperus communis, Rosa woodsii, Chondrosium gracile, Populus tremuloides

Elevation: 8383 ft.

USGS Quadrangle: Zapata Ranch

UTM: Zone 13, E457504, N4176132, NAD 27

S. Spackman & K. Decker SS02-02

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Brassicaceae

Det. by: S. Spackman

Draba smithii Gilg ex O. E. Schulz

Great Sand Dunes Preserve, Mosca Pass Trail. About 60 clumps in late flower, early fruit, growing in rock cracks.

With: Jamesia americana, Rosa woodsii, Holodiscus dumosus.

USGS Quadrangle: Mosca Pass

UTM: Zone 13, E457090, N4175833, NAD 27

S. Spackman & K. Decker SS02-07

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Gaillardia aristata Pursh

Great Sand Dune Preserve, Medano Pass Road, 3.9 road miles from preserve/park boundary. Growing along road, uncommon.

With: Populus tremuloides, Oxytropis, Penstemon, Gilia.

Elevation: 9413 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E461083, N4187193, NAD 27

S. Spackman & K. Decker SS02-09

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Hymenoxys hoopesii (Gray) Bierner

Great Sand Dunes Preserve, Medano Pass Road, 4.6 miles from preserve/park boundary. Growing in Aspen grove. Common.

With: *Rosa*, *Geranium*, *Ribes*.

Elevation: 9416

USGS Quadrangle: Medano Pass

UTM: Zone 13, E462082, N4187795, NAD 27

S. Spackman & K. Decker SS02-11

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Aquilegia caerulea James

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest. Common.

With: *Angelica grayi*, *Osmorhiza*, *Bistorta bistortoides*, *Delphinium barbeyi*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.a

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Apiaceae

Det. by: S. Spackman

Angelica grayi Coulter & Rose

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest, common.

With: *Aquilegia coerulea*, *Osmorhiza*, *Bistorta bistortoides*, *Delphinium barbeyi*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.b

06/25/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polygonaceae

Det. by: S. Spackman

Polygonum bistortoides Pursh

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest. Common.

With: *Aquilegia coerulea*, *Angelica grayi*, *Delphinium barbeyi*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.d

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Delphinium barbeyi (Huth) Huth

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest. Locally common.

With: *Bistorta bistortoides*, *Angelica grayi*, *Aquilegia coerulea*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.e

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Delphinium barbeyi (Huth) Huth

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest.

With: *Bistorta bistortoides*, *Angelica grayi*, *Aquilegia coerulea*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.e

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Juncaceae

Det. by: S. Spackman

Luzula parviflora (Ehrhart) Desvaux

Great Sand Dunes Preserve, Medano Lake Trail. Riparian area within spruce-fir forest.

With: *Carex*, *Streptopus fassettii*, *Cardamine cordifolia*.

Elevation: 11033 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458315, N4190583, NAD 27

S. Spackman & K. Decker SS02-13.b

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Penstemon whippleanus A. Gray

Great Sand Dunes Preserve, Medano Lake Trail. Spruce-fir forest. Uncommon.

With: *Arnica*, *Stellaria*, *Juniperus communis*, *Fragaria*, *Vaccinium*, *Epilobium*.

Elevation: 10914 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458395, N4190789, NAD 27

S. Spackman & K. Decker SS02-14.a

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Saxifragaceae

Det. by: S. Spackman

Saxifraga odontoloma Piper

Great Sand Dunes Preserve, Medano Lake Trail. In spruce-fir forest along rivulet.

With: *Mimulus guttatus*, *Arnica cordifolia*, *Epilobium*, *Carex*, *Mertensia*.

Elevation: 10862 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458500, N4190843, NAD 27

S. Spackman & K. Decker SS02-15.d

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Apiaceae

Det. by: S. Spackman

Osmorhiza depauperata Philippi

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper supalpine spruce-fir forest. Common.

With: *Aquilegia coerulea*, *Angelica grayi*, *Bistorta bistortoides*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.c

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Arnica mollis Hooker

Great Sand Dunes Preserve, Medano Lake Trail. Spruce-fir forest.

With: *Juniperus communis*, *Epilobium*, *Erysimum*, *Fragaria*, *Vaccinium*.

Elevation: 10914 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458395, N4190789, NAD 27

S. Spackman & K. Decker SS02-14.b

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Onagraceae

Det. by: S. Spackman

Epilobium hornemannii Reichenback

Great Sand Dunes Preserve, Medano Lake Trail. In spruce-fir forest along rivulet.

With: *Micranthes odontoloma*, *Arnica cordifolia*, *Mertensia*.

Elevation: 10862 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458500, N4190843, NAD 27

S. Spackman & K. Decker SS02-15.c

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: S. Spackman

Arnica cordifolia Hooker

Great Sand Dunes Preserve, Medano Lake Trail. In spruce-fir forest.

With: *Valeriana capitata*

Elevation: 10862

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458500, N4190843, NAD 27

S. Spackman SS02-15.e

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Gentianaceae Det. by: S. Spackman

Frasera speciosa Douglas ex Grisebach

Great Sand Dune Preserve, Medano Lake Trail. Growing in open meadow on edge of spruce-fir forest.

With: *Populus tremuloides*, *Geranium*, *Fragaria*.

Elevation: 10642 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458990, N4190806, NAD 27

S. Spackman & K. Decker SS02-16.d

06/26/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: S. Spackman

Antennaria umbrinella Rydberg

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common, phyllaries are brownish with light color to tip.

With: *Potentilla*, *Erysimum capitatum*, *Tetraneuris brevifolia*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS02-17.a

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Brassicaceae Det. by: S. Spackman

Erysimum capitatum (Douglas) Greene

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Antennaria umbrinella*, *Potentilla*, *Tetraneuris brevifolia*

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.c

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: S. Spackman

Tetraneuris acaulis

var. *caespitosa* A. Nels.

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Antennaria umbrinella*, *Potentilla*, *Erysimum capitatum*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.d

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Elymus scribneri (Vasey) Jones

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Antennaria umbrinella*, *Potentilla*, *Erysimum capitatum*

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.g

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Poa glauca M. Vahl

ssp. rupicola (Nash) W. A. Weber

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Antennaria umbrinella*, *Potentilla*, *Erysimum capitatum*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.l

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae Det. by: S. Spackman

Penstemon hallii A. Gray

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Poa glauca*, *Elymus scribneri*, *Erigeron pinnatisectus*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.m

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Grossulariaceae Det. by: S. Spackman

Ribes montigenum McClatchie

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Rare.

With: *Eriogonum flavum*.

Elevation: 11461 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455535, N4198004, NAD 27

S. Spackman & K. Decker SS20-18.a

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: S. Spackman

Erigeron pinnatisectus (A. Gray) A. Nelson

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite.

With: *Poa glauca*, *Elymus scribneri*, *Erysimum capitatum*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.l

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Hydrophyllaceae Det. by: S. Spackman

Phacelia sericea (R. Graham) A. Gray

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Common.

With: *Elymus scribneri*, *Erigeron pinnatisectus*, *Penstemon hallii*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.n

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polygonaceae Det. by: S. Spackman

Eriogonum flavum Nutt.

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite. Uncommon.

With: *Ribes montigenum*.

Elevation: 11461 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455535, N4198004, NAD 27

S. Spackman & K. Decker SS02-18.b

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Saxifragaceae

Det. by: S. Spackman

Saxifraga bronchialis

ssp. austromontana (Wieg.) Piper

Great Sand Dune Preserve, Music Pass, just north of trail over pass.
Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky
pin cushion community on pink granite. Common.
With: Eriogonum jamesii, Ribes montigenum.

Elevation: 11461 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E45535, N4198004, NAD 27

S. Spackman & K. Decker SS20-18.c

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Castilleja occidentalis Torrey

Great Sand Dune Preserve, Music Pass, just north of trail over pass.
Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky
pin cushion community on pink granite. Common.
With: Pedicularis parryi.

Elevation: 11423 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455598, N4197862, NAD 27

S. Spackman & K. Decker SS20-19.c

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Pedicularis parryi A. Gray

Great Sand Dune Preserve, Music Pass, just north of trail over pass.
Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky
pin cushion community on pink granite. Common.
With: Castilleja occidentalis.

Elevation: 11423 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455598, N4197862, NAD 27

S. Spackman & K. Decker SS20-19.d

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Brassicaceae

Det. by: S. Spackman

Draba streptocarpa A. Gray

Great Sand Dune Preserve, Music Pass, just north of trail over pass.
Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky
pin cushion community on pink granite. Uncommon.
With: Castilleja occidentalis, Pedicularis parryi.

Elevation: 11423 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455598, N4197862, NAD 27

S. Spackman & K. Decker SS20-19.a

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Aconitum columbianum Nuttall ex Torrey & Gray

Great Sand Dunes Preserve, above Lower Sand Creek Lake, NW of Lake on
SE facing slope. In upper subalpine forest of Engelmann Spruce. Common
where wet.

With: Veronica nutans, Bistort bistortoides, Luzula parviflora, Potentilla, Arnica.

Flower color: purple

Elevation: 11605 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453064, N4198217, NAD 27

S. Spackman & K. Decker SS02-20.c

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Veronica wormskejoldii Roemer & J. A. Schultes

Great Sand Dunes Preserve, above Lower Sand Creek Lake, NW of Lake on
SE facing slope. In upper subalpine forest of Engelmann Spruce. Very
common.

*With: Aconitum columbianum, Bistort bistortoides, Luzula parviflora,
Potentilla, Arnica, Erigeron, Veratrum.*

Flower color: purple

Elevation: 11605 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453064, N4198217, NAD 27

S. Spackman & K. Decker SS02-20.d

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pteridaceae

Det. by: S. Spackman

Cryptogramma acrostichoides R. Brown

Great Sand Dunes Preserve, steep talus slope northwest of Lower Sand Creek Lake, SE facing slope. Growing on talus. Uncommon.

With: *Senecio atratus*, *Vaccinium*, *Arnica*, *Campanula*.

Elevation: 11716 ft.

USGS Quadrangle: Creston Peak

UTM: Zone 13, E453138, N4198379, NAD 27

S. Spackman & K. Decker SS02-21.a

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Senecio atratus Greene

Great Sand Dunes Preserve, steep talus slope northwest of Lower Sand Creek Lake, SE facing slope. Growing on Talus. Common.

With: *Vaccinium*, *Arnica*, *Campanula*.

Flower color: Yellow

Elevation: 11716 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453138, N4198379, NAD 27

S. Spackman & K. Decker SS02-21.b

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Liliaceae

Det. by: S. Spackman

Zigadenus elegans

ssp. elegans Pursh

Great Sand Dunes Preserve, steep slope northwest of Lower Sand Creek Lake, SE facing slope. Common.

With: *Sambucus*, *Ribes*, *Frasera speciosa*, *Pentaphylloides floribunda*.

Flower color: White

Elevation: 11813 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453206, N4198437, NAD 27

S. Spackman & K. Decker SS02-22

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Liliaceae

Det. by: S. Spackman

Allium geayeri S. Watson

Great Sand Dunes Preserve, on ridge between Upper and Lower Sand Creek Lakes. Growing in dry alpine meadow with native graminoids. Common.

With: *Erigeron pinnatisectus*, *Pedicularis*.

Flower color: Pink

Elevation: 12144 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453162, N4198595, NAD 27

S. Spackman & K. Decker SS02-23.a

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Castilleja haydenii (A. Gray) Cockerell

Great Sand Dunes Preserve, on ridge between Upper and Lower Sand Creek Lakes. Growing in dry alpine meadow with and native graminoids. Common.

With: *Allium geayeri*, *Erigeron pinnatisectus*, *Pedicularis*.

Flower color: Magenta

Elevation: 12144 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453162, N4198595

S. Spackman & K. Decker SS02-23.b

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Fabaceae

Det. by: S. Spackman

Trifolium dasyphyllum Torrey & Gray

Great Sand Dunes Preserve, on ridge between Upper and Lower Sand Creek Lakes. Growing in dry alpine meadow with native graminoids. Common.

With: *Allium geayeri*, *Castilleja haydenii*, *Hymenoxys grandiflora*, *Erigeron pinnatisectus*, *Pedicularis*.

Elevation: 12144 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453162, N4198595, NAD 27

S. Spackman & K. Decker SS02-23.e

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Pedicularis groenlandica Retzius

Great Sand Dunes Preserve, Sangre de Cristo Mountains, northwest of Lower Sand Creek Lake. Wetland shelf in subalpine Engelmann Spruce forest.

With: *Clemensia rhodantha*, *Psychrophila leptosepala*, *Senecio triangularis*.

Elevation: 11500 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452708, N4198650, NAD 27

S. Spackman & K. Decker SS02-25.a

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Crassulaceae

Det. by: S. Spackman

Rhodiola rhodantha (A. Gray) Rose

Great Sand Dunes Preserve, Sangre de Cristo Mountains, northwest of Lower Sand Creek Lake. Wetland shelf in subalpine Engelmann Spruce forest.

With: *Psychrophila leptosepala*, *Senecio triangularis*.

Flower color: Pink

Elevation: 11500 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452708, N4198650, NAD 27

S. Spackman & K. Decker SS02-25.b

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Caltha leptosepala DC.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, northwest of Lower Sand Creek Lake. Wetland shelf in subalpine Engelmann Spruce forest.

With: *Clemensia rhodantha*, *Senecio triangularis*, *Pedicularis groenlandica*.

Elevation: 11500 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452708, N4198650, NAD 27

S. Spackman & K. Decker SS02-25.c

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Senecio triangularis Hooker

Great Sand Dunes Preserve, Sangre de Cristo Mountains, northwest of Lower Sand Creek Lake. Wetland shelf in subalpine Engelmann Spruce forest.

With: *Clemensia rhodantha*, *Caltha leptosepala*, *Pedicularis groenlandica*.

Flower color: Pink

Elevation: 11500 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452708, N4198650, NAD 27

S. Spackman & K. Decker SS02-25.d

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polemoniaceae

Det. by: S. Spackman

Polemonium pulcherrimum Hooker

ssp. delicatum (Rydberg) Brand

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along trail to Lower Sand Creek Lake. Subalpine spruce-fir forest.

With: *Ligularia*, *Moneses uniflora*.

Elevation: 11400 ft.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-26.b

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pyrolaceae

Det. by: S. Spackman

Moneses uniflora (L.) A. Gray

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along trail to Lower Sand Creek Lake. Subalpine spruce-fir forest.

With: *Ligularia*, *Polemonium pulcherrimum*.

Elevation: 11400 ft.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-26.c

07/09/2002

Colorado Natural Heritage Program

Plants of Colordado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Veronica wormskjoldii Roemer & J. A. Schultes

Great Sand Dunes Preserve, Medano lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest. Uncommon

With: Delphinium barbeyi, Hydrophyllum fendleri, Castilleja rhexifolia.

Flower color: purple

Elevation: 11051

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.j

06/26/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae

Det. by: S. Spackman

Carex bella L. H. Bailey

Great Sand Dunes Preserve, Medano Lake Trail. Riparian area within spruce-fir forest.

With: Luzula parviflora, Streptopus fassettii, Cardamine cordifolia

Elevation: 11033 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458315, N4190583, NAD 27

S. Spackman & K. Decker SS02-13.a

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Liliaceae

Det. by: S. Spackman

Streptopus amplexifolius

var. chalazatus Fassett

Great Sand Dunes Preserve, Medano Lake Trail. Riparian area within spruce-fir forest.

With: Luzula parviflora, Cardamine cordifolia, Carex bella.

Elevation: 11033 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458315, N4190583, NAD 27

S. Spackman & K. Decker SS02-13.c

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Juncaceae

Det. by: S. Spackman

Juncus mertensianus Bongard

Great Sand Dunes Preserve, Medano Lake Trail. Growing in spruce-fir forest along rivulet.

With: Micranthes odontoloma, Epilobium hornemannii, Arnica cordifolia, Mertensia.

Elevation: 10862

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458500, N4190843, NAD 27

S. Spackman SS02-15.a

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Bromus inermis

var. pumpellianus (Scribn.) C. L. Hitchc.

Great Sand Dune Preserve, Medano Lake Trail. Growing in open meadow on edge of spruce-fir forest.

With: Fraxera speciosa, Potentilla, Populus tremuloides, Geranium, Fragaria.

Elevation: 10642 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458990, N4190806, NAD 27

S. Spackman & K. Decker SS02-16.c

06/26/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Fabaceae

Det. by: S. Spackman

Astragalus alpinus L.

Great Sand Dune Preserve, Medano Lake Trail. Growing in open meadow on edge of spruce-fir forest.

With: Fraxera speciosa, Potentilla, Populus tremuloides, Geranium, Fragaria.

Elevation: 10642 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458990, N4190806, NAD 27

S. Spackman & K. Decker SS02-16.e

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Trisetum spicatum (L.) Richter

Great Sand Dune Preserve, Music Pass, just north of trail over pass.
Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky
pin cushion community on pink granite. Common.

With: Antennaria umbrinella, Potentilla, Erysimum capitatum.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.e

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Rosaceae Det. by: S. Spackman

Dryas octopetala

ssp. hookeriana (Juzepczuk) Hulten

Great Sand Dunes Preserve, Sangre de Cristo Mountains, flat area just below
(to east) of saddle (elev. 12,500) due west of Medano Lake. Growing in dry,
rocky alpine meadow. Common, in fruit.

With: Poa arctica, Acomastylis rossii, Carex.

Elevation: 12273 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E456707, N4189788

S. Spackman & K. Decker SS02-27.a

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Rosaceae Det. by: S. Spackman

Geum rossii

var. turbinatum (Rydb.) C. L. Hitchc.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, flat area just below
(to east) of saddle (elev. 12,500) due west of Medano Lake. Dry, rocky alpine
meadow.

With: Poa arctica, Dryas octopetala, Carex.

Elevation: 12273 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E456707, N4189788

S. Spackman & K. Decker SS02-27.c

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Deschampsia cespitosa (L.) P. Beauvois

Great Sand Dunes Preserve, Sangre de Cristo Mountains, flat area just below
(to east) of saddle (elev. 12,500) due west of Medano Lake. Dry, rocky alpine
meadow. Local in drainage area.

With: Poa arctica, Dryas octopetala, Acomastylis rossii.

Elevation: 12273 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E456707, N4189788

S. Spackman & K. Decker SS02-27.d

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Carex nova Bailey

Great Sand Dunes Preserve, Sangre de Cristo Mountains, flat area just below
(to east) of saddle (elev. 12,500) due west of Medano Lake. Dry, rocky alpine
meadow. Local in drainage area.

With: Poa arctica, Dryas octopetala, Deschampsia cespitosa.

Elevation: 12273 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E456707, N4189788

S. Spackman & K. Decker SS02-27.e

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Gentianaceae Det. by: S. Spackman

Swertia perennis L.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, west shore of
Medano Lake. Common.

*With: Salix planifolia, Juncus mertensianus, Dodecatheon, Pedicularis
groenlandica, Clementsia.*

Flower color: purple

Elevation: 11520 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-29.a

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Salicaceae Det. by: S. Spackman

Salix planifolia Pursh

Great Sand Dunes Preserve, Sangre de Cristo Mountains, west shore of Medano Lake. Common.

With: Salix brachycarpa, Swertia perennis, Juncus mertensianus, Dodecatheon, Pedicularis groenlandica, Clementsia.

Elevation: 11520 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-29.b

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Juncaceae Det. by: S. Spackman

Juncus mertensianus Bongard

Great Sand Dunes Preserve, Sangre de Cristo Mountains, west shore of Medano Lake. Common.

With: Salix brachycarpa, Salix planifolia, Swertia perennis, Dodecatheon, Pedicularis groenlandica, Clementsia.

Elevation: 11520 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-29.c

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Salicaceae Det. by: S. Spackman

Salix brachycarpa Nuttall

Great Sand Dunes Preserve, Sangre de Cristo Mountains, west shore of Medano Lake. Common.

With: Juncus mertensianus, Salix planifolia, Swertia perennis, Dodecatheon, Pedicularis groenlandica, Clementsia.

Elevation: 11520 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-29.d

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Phleum alpinum L.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides.

With: Penstemon, Solidago, Poa.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.d

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Trisetum spicatum (L.) Richter

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides.

With: Penstemon, Solidago, Poa.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.e

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polemoniaceae Det. by: S. Spackman

Phlox condensata (A. Gray) E. Nelson

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides.

With: Penstemon, Solidago, Poa.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.f

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Caryophyllaceae

Det. by: S. Spackman

Silene acaulis

var. subacaulescens (F. N. Williams) Fern & St. John

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides, mat-forming growth form.

With: Penstemon, Solidago, Poa.

Flower color: purple

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.h

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae

Det. by: S. Spackman

Carex albo-nigra MacKenzie in Rydberg

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides.

With: Polemonium viscosum, Mertensia, Penstemon.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.n

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Danthonia parryi Scribner

Great Sand Dunes Preserve, Sangre de Cristo Mountains, steep rocky southeast facing slope above Medano Lake. Dominant grass on slope.

With: Campanula rotundifolia, Achillea, Vaccinium, Juniperus communis, Pentaphylloides floribunda.

Elevation: 11925 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457122, N4189855, NAD 27

S. Spackman & K. Decker SS02-28

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polemoniaceae

Det. by: S. Spackman

Polemonium viscosum Nuttall

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft.. Alpine meadow with native graminoides. Common.

With: Mertensia, Penstemon, Solidago.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.j

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Danthonia parryi Scribner

Great Sand Dunes Preserve, Sangre de Cristo Mountains, steep rocky southeast facing slope above Medano Lake. Dominant grass on slope.

With: Campanula rotundifolia, Achillea, Vaccinium, Juniperus communis, Pentaphylloides floribunda.

Elevation: 11925 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457122, N4189855, NAD 27

S. Spackman & K. Decker SS02-28

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Poa nemoralis

ssp. interior (Rydberg) W. A. Weber

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes, between 12,200 and 12,579 ft. Alpine meadow with native graminoides. Common.

With: Penstemon, Phleum commutatum, Solidago.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.c

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Apiaceae Det. by: S. Spackman
Oxyopolis fendleri (A. Gray) Heller

Great Sand Dunes Preserve, Medano Pass Road, 4 miles from preserve/park boundary toward pass. Growing in small drainage.

With: *Aspen*, *Alder*, *Heracleum*, *Thermopsis*, *Rosa*.

Elevation: 9416 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E461105, N4187230, NAD 27

S. Spackman & K. Decker SS02-10.d

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Caryophyllaceae Det. by: S. Spackman
Stellaria crassifolia Ehrhart

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile below Medano Lake. Upper subalpine spruce-fir forest. Uncommon.

With: *Bistorta bistortoides*, *Angelica grayi*, *Draba aurea*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432, NAD 27

S. Spackman & K. Decker SS02-12.f

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Caryophyllaceae Det. by: S. Spackman
Arenaria fendleri

var. *fendleri* Gray

Great Sand Dunes Preserve, Medano Lake Trail. Spruce-fir forest

With: *Juniperus communis*, *Chamerion*, *Erysimum*, *Fragaria*, *Vaccinium*.

Elevation: 10914 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458395, N4190789, NAD 27

S. Spackman & K. Decker SS02-14.d

06/26/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman
Carex aquatilis Wahlenberg

Great Sand Dunes Preserve, Sangre de Cristo Mountains, outflow of Medano Lake. Common in wetland.

With: *Zygadenus elegans*, *Salix planifolia*, *Bistorta bistortoides*, *Pedicularis groenlandica*.

Elevation: 11520 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-30.a

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pinaceae Det. by: S. Spackman
Picea engelmannii Parry ex Engelmann

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Lake Basin. Near lake outflow. Dominant species in area.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-31

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Apiaceae Det. by: S. Spackman
Pseudocymopterus montanus (A. Gray) Coulter & Rose

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along Medano Lake Trail. Mesic subalpine meadow. Common.

With: *Bistorta bistortoides*, *Pedicularis groenlandica*, *Carex*.

Flower color: Yellow

Elevation: 11940 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457676, N4190051, NAD 27

S. Spackman & K. Decker SS02-32.a

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Erigeron melanocephalus A. Nelson

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along Medano Lake Trail. Mesic subalpine meadow. Rare, only local.

With: Pseudocymopterus montanus, Bistort bistortoides, Pedicularis groenlandica, Carex.

Elevation: 11940 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457676, N4190051, NAD 27

S. Spackman & K. Decker SS02-32.c

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Artemisia scopulorum A. Gray

Great Sand Dunes Preserve, Sangre de Cristo Mountains. Growing on dry, rocky north-facing slope with native graminoides.

With: Salix reticulata ssp. nivalis, Solidago, Pedicularis.

Elevation: 11331 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457902, N4190112, NAD 27

S. Spackman & K. Decker SS02-33.b

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Polygonaceae

Det. by: S. Spackman

Polygonum viviparum L.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along Medano Lake Trail. Steep, rocky north-facing slope, upper sub alpine. Growing with mosses.

With: Salix arctica, Artemisia, Geum rosii.

Elevation: 11304 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457902, N4190172, NAD 27

S. Spackman & K. Decker SS02-34.c

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Salicaceae

Det. by: S. Spackman

Salix nivalis Hook.

Great Sand Dunes Preserve, Sangre de Cristo Mountains. Growing on dry, rocky north-facing slope with native graminoides.

With: Artemisia scopulorum, Solidago, Pedicularis.

Elevation: 11331 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457902, N4190112, NAD 27

S. Spackman & K. Decker SS02-33.a

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Salicaceae

Det. by: S. Spackman

Salix petrophila Rydb.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along Medano Lake Trail. Steep, rocky north-facing slope, upper sub alpine. Growing with mosses.

With: Bistorta vivipara, Artemisia, Geum rossii.

Elevation: 11304 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E457902, N4190172, NAD 27

S. Spackman & K. Decker SS02-34.b

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Bromus carinatus Hook. & Arn.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, along a short section of the Medano Lake Trail. Upper subalpine at approximately 11,200 ft.

With: Aconitum barbeyi, Epilobium, Luzula parviflora, Ribes montigenum.

Elevation: 11200 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-35

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Thalictrum fendleri Engelm. ex A. Gray

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Lake Trail. Riparian area within spruce-fir forest. Male plant.

With: *Cardamine cordifolia*.

Elevation: 11033 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458315, N4190583, NAD 27

S. Spackman & K. Decker SS02-36

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae

Det. by: S. Spackman

Thalictrum fendleri Engelm. ex A. Gray

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Lake Trail. Riparian area within spruce-fir forest. Female plant.

With: *Cardamine cordifolia*.

Elevation: 11033 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458315, N 4190583, NAD 27

S. Spackman & K. Decker SS02-36

07/11/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Onagraceae

Det. by: S. Spackman

Oenothera elata

ssp. hirsutissima (Gray ex S. Wats.) W. Dietr.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Streamside near Medano Pass Road, behind campsite # 1.8. Rare.

With: *Salix exigua*, *Alnus incana*, *Calamagrostis canadensis*.

Flower color: Yellow

Elevation: 8800 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-38.a

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Juncaceae

Det. by: S. Spackman

Juncus longistylis Torrey

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Streamside near Medano Pass Road, behind campsite # 1.8. Common.

With: *Oenothera elata*, *Epilobium*, *Agrostis scabra*.

Elevation: 8800 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-38.c

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Lamiaceae

Det. by: S. Spackman

Prunella vulgaris L.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Streamside near Medano Pass Road, behind campsite # 1.8.

With: *Oenothera elata*, *Epilobium*, *Agrostis scabra*, *Juncus longistylis*.

Elevation: 8800 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-38.f

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Euphorbiaceae

Det. by: S. Spackman

Euphorbia esula

var. esula L.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Historic cabin site along Medano Pass Road. In Aspen grove. Common, especially near stream.

With: *Bromus inermis*, *Poa*, *Cryptantha*.

Elevation: 9930 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E460782, N4186957, NAD 27

S. Spackman & K. Decker SS02-39.a

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Bromus inermis (Leysser) Holub

Great Sand Dunes Preserve, Sangre de Cristo Mountains. Historic cabin site along Medano Pass Road. In Aspen grove

With: *Tithymalus esula*, *Cryptantha*, *Poa*.

Elevation: 9930 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E460782, N4186957, NAD 27

S. Spackman & K. Decker SS02-39.d

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Caryophyllaceae Det. by: S. Spackman

Cerastium fontanum Baumgartner

Great Sand Dunes Preserve, Sangre de Cristo Mountains, next to historic cabin site along Medano Pass Road. Streamside, rare.

With: *Alnus incana*, *Salix bebbiana*, *Salix drummondiana*, *Carex*.

Elevation: 9930 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-40.a

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Rosaceae Det. by: S. Spackman

Dasiphora floribunda (Pursh) Kartesz, comb. nov. ined.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, next to historic cabin site along Medano Pass Road. Streamside, common.

With: *Alnus incana*, *Salix bebbiana*, *Salix drummondiana*, *Carex*.

Elevation: 9930 ft.

USGS Quadrangle: Medano Pass

S. Spackman & K. Decker SS02-40.b

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Elaeagnaceae Det. by: S. Spackman

Shepherdia canadensis (L.) Nuttall

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Pass Road. White fir forest with Aspen. Rare, in deeply shaded forest.

With: *Actea rubra*, *Packera*.

Elevation: 9648 ft.

UTM: Zone 13, E459228, N4185537, NAD 27

S. Spackman & K. Decker SS02-42.a

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Ranunculaceae Det. by: S. Spackman

Actaea rubra

ssp. arguta (Nuttall in Torrey & Gray)
Hulten

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Pass Road. White fir forest with Aspen. Rare in mesic area along stream.

With: *Shepherdia canadensis*, *Packera*.

Elevation: 9648 ft.

UTM: Zone 13, E459228, N4185537, NAD 27

S. Spackman & K. Decker SS02-42.b

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Rubiaceae Det. by: S. Spackman

Galium triflorum Michaux

Great Sand Dunes Preserve, Sangre de Cristo Mountains, behind campsite 1.8 on Medano Pass Road. Along stream, rare.

With: *Populus augustifolia*, *Alnus incana*, *Heracleum*, *Geranium*.

Flower color: White

Elevation: 8879 ft.

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-43.a

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Carex pellita Muhl ex Willd.

Great Sand Dunes Preserve, Sangre de Cristo Mountains, behind campsite 1.8 on Medano Pass Road. Along stream.

With: *Populus augustifolia*, *Alnus incana*, *Heracleum*, *Geranium*.

Elevation: 8879 ft.

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-43.b

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Scirpus microcarpus J. & K. Presl

Great Sand Dunes Preserve, Sangre de Cristo Mountains, behind campsite 1.8 on Medano Pass Road. Along stream.

With: *Populus augustifolia*, *Alnus incana*, *Heracleum*, *Geranium*.

Elevation: 8879 ft.

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-43.c

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Carex utriculata F. Boott

Great Sand Dunes Preserve, Sangre de Cristo Mountains, behind campsite 1.8 on Medano Pass Road. Along stream.

With: *Populus augustifolia*, *Alnus incana*, *Heracleum*, *Geranium*.

Elevation: 8879 ft.

UTM: Zone 13, E458514, N4184881, NAD 27

S. Spackman & K. Decker SS02-43.d

07/12/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: S. Spackman

Cirsium canescens Nuttall

Great Sand Dunes Preserve, Sangre de Cristo Mountains, Medano Pass Road at about 9600 ft. Common.

With: *Stipa comata*, *Campanula rotundifolia*, *Bromus inermis*.

Flower color: Ochroleucous

Elevation: 9600 ft.

UTM: Zone 13, E461858, N4188280, NAD 27

S. Spackman & K. Decker SS02-45.a

07/13/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Carex scopulorum Holm

Great Sand Dunes Preserve, Upper Sand Creek Lake. Along outflow of lake.

With: *Pedicularis groenlandica*, *Clementsia rhodantha*, *Salix planifolia*, *Picea engelmannii*.

Elevation: 11796 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452707, N4199313, NAD 27

S. Spackman & K. Decker SS02-55.a

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Gentianaceae Det. by: S. Spackman

Gentiana algida Pallas

Great Sand Dunes Preserve, Upper Sand Creek Lake. North-facing rock outcrop in upper sub alpine. Common.

Elevation: 11786 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452628, N4199347, NAD 27

S. Spackman & K. Decker SS02-56.a

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Danthonia intermedia Vasey

Great Sand Dunes Preserve, Upper Sand Creek Lake. North-facing rock outcrop in upper sub alpine. Common.

Elevation: 11786 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452628, N4199347, NAD 27

S. Spackman & K. Decker SS02-56.c

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Orchidaceae Det. by: S. Spackman

Spiranthes romanzoffiana Chamisso

Great Sand Dunes Preserve, Upper Sand Creek Lake. In wet meadow. Rare.
With: Clementsia rhodantha, Pedicularis groenlandica, Carex.

Elevation: 11753 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452468, N4199396, NAD 27

S. Spackman & K. Decker SS02-57.a

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Cyperaceae Det. by: S. Spackman

Eriophorum angustifolium Honckeney

Great Sand Dunes Preserve, Upper Sand Creek Lake. In wet meadow. Rare.
With: Clementsia rhodantha, Pedicularis groenlandica, Carex.

Elevation: 11753 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452468, N4199396, NAD 27

S. Spackman & K. Decker SS02-57.b

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Bromus ciliatus

var. ciliatus L.

Great Sand Dunes Preserve. South-facing slopes above Upper Sand Creek Lake. Dry, upper subalpine.

With: Salix brachycarpa, Potentilla.

Elevation: 11834 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452311, N4199459, NAD 27

S. Spackman & K. Decker SS02-58.a

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Festuca thurberi Vasey in Rothrock

Great Sand Dunes Preserve. Near intersection of Music Pass Trail and Sand Creek Trail.

With: Bromopsis pumpelliana, Potentilla, Campanula.

Elevation: 11084 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E454251, N4198474, NAD 27

S. Spackman & K. Decker SS02-60.a

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae Det. by: S. Spackman

Bromus inermis

var. pumpellianus (Scribn.) C.L. Hitchc.

Great Sand Dunes Preserve. Along trail between Upper and Lower Sand Creek Lakes.

With: Festuca thurberi, Potentilla, Campanula.

Elevation: 11084 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E454251, N4198474, NAD 27

S. Spackman & K. Decker SS02-60.b

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Elymus trachycaulus (Link) Gould ex Shinners

Great Sand Dunes Preserve. Along trail between Upper and Lower Sand Creek Lakes.

With: *Erigeron elatior*.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-61.b

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Poaceae

Det. by: S. Spackman

Redfieldia flexuosa (Thurber ex A. Gray)

Great Sand Dunes Preserve. Along Dunes Trail. Sandy soil.

With: *Chrysothamnus Greenei*, *Aristida purpurea*, *Euphorbia*.

USGS Quadrangle: Zapata Ranch

S. Spackman & K. Decker SS02-65.g

8/21/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Scrophulariaceae

Det. by: S. Spackman

Castilleja rhexifolia Rydberg

Great Sand Dunes Preserve, Medano Lake Trail, about 1 mile before Medano Lake. Upper subalpine spruce-fir forest. Common.

With: *Stellaria crassifolia*, *Veronica nutans*, *Delphinium barbeyi*.

Elevation: 11051 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E458264, N4190432

S. Spackman & K. Decker SS02-12.I

6/26/02

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Solidago nana Nuttall

Great Sand Dunes Preserve, Sangre de Cristo Mountains, on ridge between upper and lower Sand Creek Lakes between 12,200 and 12,579 ft. Alpine meadow with native gaminoides. Very common.

With: *Poa nemoralis*, *Phleum commutatum*, *Trisetum spicatum*.

Flower color: Yellow

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-24.b

07/09/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae

Det. by: S. Spackman

Artemisia campestris

var. *borealis* (Pallas) M. E. Peck

Great Sand Dune Preserve, Music Pass, just north of trail over pass.

Alpine/subalpine meadow with scattered Krumholtz Bristlecone Pine. Rocky pin cushion community on pink granite.

With: *Poa glauca*, *Elymus scribneri*, *Erysimum capitatum*.

Elevation: 11424 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E455554, N4197925, NAD 27

S. Spackman & K. Decker SS20-17.j

06/27/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Brassicaceae

Det. by: S. Spackman

Draba smithii Gilg ex O. E. Schulz

Great Sand Dune Preserve, Upper Sand Creek Lake Trail. East-facing rock outcrop within Engelmann Spruce forest, about 11 plants in fruit.

With: *Epilobium*, *Polemonium*.

Elevation: 11344 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453769, N4198955

S. Spackman and K. Decker SS02-53.a

08/20/02

Plants of Colorado**Saguache County**

Cyperaceae Det. by: S. Spackman

***Carex ebenea* Rydberg**

Great Sand Dune Preserve, Upper Sand Creek Lake Trail. Within Engelmann Spruce forest.

With: *Epilobium*, *Polemonium*.

Elevation: 11344 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E453769, N4198955

S. Spackman and K. Decker SS02-53.b

08/20/02

Plants of Colorado**Saguache County**

Poaceae Det. by: S. Spackman

***Calamagrostis canadensis* (Michaux) P. Beauvois**

Great Sand Dune Preserve, Upper Sand Creek Lake. Common along lake shore.

With: *Picea engelmannii*, *Salix brachycarpa*, *Clementsia rhodantha*, *Juncus*.

Elevation: 11313 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452845, N4198967

S. Spackman and K. Decker SS02-54

08/20/02

Colorado Natural Heritage Program**Plants of Colorado****Saguache County**

Poaceae Det. by: S. Spackman

***Deschampsia cespitosa* (L.) P. Beauvois**

Great Sand Dunes Preserve, Upper Sand Creek Lake. Along outflow of lake.

With: *Pedicularis groenlandica*, *Clementsia rhodantha*, *Salix planifolia*, *Picea engelmannii*.

Elevation: 11796 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452707, N4199313, NAD 27

S. Spackman & K. Decker SS02-55.c

8/20/2002

Colorado Natural Heritage Program**Plants of Colorado****Saguache County**

Asteraceae Det. by: S. Spackman

***Oreochrysum parryi* (A. Gray) Rydberg**

Along outflow drainage of Upper Sand Creek Lake.

With: *Erigeron elatior*.

Elevation: 11800 ft.

USGS Quadrangle: Crestone Peak

UTM: Zone 13, E452739, N4199362, NAD 27

S. Spackman & K. Decker SS02-59.a

8/20/2002

Colorado Natural Heritage Program**Plants of Colorado****Saguache County**

Asteraceae Det. by: S. Spackman

***Erigeron elatior* (A. Gray) Greene**

Along trail between Upper and Lower Sand Creek Lakes.

With: *Elymus trachycaulus*.

Flower color: White

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-61.a

8/20/2002

Colorado Natural Heritage Program**Plants of Colorado****Saguache County**

Fabaceae Det. by: S. Spackman

***Lupinus argenteus* Pursh**

Music Pass Trail near intersection with Sand Creek Lake Trail. Common.

Elevation: 11000 ft.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-62.b

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Fabaceae Det. by: S. Spackman

Lupinus argenteus Pursh

Music Pass Trail near intersection with Sand Creek Lake Trail. Common.

Elevation: 11000 ft.

USGS Quadrangle: Crestone Peak

S. Spackman & K. Decker SS02-62.b

8/20/2002

Colorado Natural Heritage Program

Plants of Colorado

Alamosa County

Asteraceae Det. by: S. Spackman

Heterotheca canescens (De Candolle) Shinnery

Great Sand Dunes National Monument. Trail between visitor center and picnic area. In sandy soil.

With: *Erigeron*, *Tetradymia canescens*.

USGS Quadrangle: Zapata Ranch

S. Spackman & K. Decker SS02-63d

8/21/2002

Colorado Natural Heritage Program

Plants of Colorado

Alamosa County

Asteraceae Det. by: S. Spackman

Senecio spartioides

var. *multicapitatus* (Greenm. Ex Rydb.)

Welsh

Great Sand Dunes NM, along Dunes Trail. One meter tall, in sandy soil.

With: *Redfieldia flexuosa*, *Euphorbia*, *Chrysothamnus Greenei*.

Flower color: Yellow

Elevation: 8120 ft.

S. Spackman & K. Decker SS02-65d

8/21/2002

Colorado Natural Heritage Program

Plants of Colorado

Alamosa County

Poaceae Det. by: S. Spackman

Aristida purpurea Nuttall

Great Sand Dunes NM, along Dunes Trail.

With: *Redfieldia flexuosa*, *Euphorbia*, *Chrysothamnus Greenei*.

Flower color: Yellow

Elevation: 8120 ft.

USGS Quadrangle: Zapata Ranch

S. Spackman & K. Decker SS02-65f

8/21/2002

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Asteraceae Det. by: K. Decker

Heliomeris multiflora Nuttall

Great Sand Dunes Preserve, Buck Creek.

With: *Juncus longistylis*, *Pharlaris*, *Erigeron*.

Flower color: Yellow

Elevation: 8405 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E455985, N4178215, NAD 27

K. Decker & S. Anderson KD02-02.c

09/10/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Juncaceae Det. by: K. Decker

Juncus longistylis Torrey

Great Sand Dunes Preserve, Buck Creek.

With: *Heleomeris multiflora*, *Pharlaris*, *Erigeron*.

Elevation: 8405 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E455985, N4178215, NAD 27

K. Decker & S. Anderson KD02-02.d

09/10/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Chenopodiaceae Det. by: K. Decker

Chenopodium album L.

Great Sand Dunes Preserve, Buck Creek. Burnt ravine with Aspen suckers.

With: Ribes, Holodiscus discolor, Senecio, Corydalis.

Elevation: 8536 ft.

USGS Quadrangle: Medano Pass

UTM: Zone 13, E456297, N4178224, NAD 27

K. Decker & S. Anderson KD02-03.c

09/10/02

Colorado Natural Heritage Program

Plants of Colorado

Saguache County

Pinaceae Det. by: S. Spackman

Pinus aristata Engelman

Great Sand Dunes Preserve. Music Pass Trail near intersection with Sand Creek Lake Trail. Common.

With: Lupinus argenteus

Elevation: 11000 ft.

S. Spackman & K. Decker SS02-62.c

8/20/2002

Colorado Natural Heritage Program

Appendix 3

Element occurrence records for *Draba smithii*, *Cleome multicaulis*, *Cryptantha pustulosa* and *Woodsia neomexicana* at GRSA (Colorado Natural Heritage Program 2002).

Element Occurrence Record

DRABA SMITHII SMITH WHITLOW-GRASS

LOCATORS

PLACE NAME: UPPER SAND CREEK LAKE TRAIL LAT: 375620N
POTENTIAL CONSERVATION AREA: LONG: 1053134W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: Saguache QUADNAME: CRESTONE PEAK

TOWNSHIP/RANGE: SECTION:
024S073W 26

DIRECTIONS: [SPACKMAN AND DECKER 2002:] ZONE: 13, NORTHING: 4198953, EASTING: 453769. ALONG THE UPPER SAND CREEK LAKE TRAIL. ELEVATION: 11,344 FT.

MINIMUM ELEVATION MAXIMUM ELEVATION:

HABITAT: [SPACKMAN AND DECKER 2002:] EAST-FACING ROCK OUTCROP WITHIN ENGELMANN SPRUCE FOREST. GROWING WITH EPILOBIUM AND POLEMONIUM. ELEVATION: 11,344 FT.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G2 STATE RANK: S2 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: C RANK DATE: 2002-08-20

OCCURRENCE RANK COMMENTS:
[SPACKMAN AND DECKER 2002:] SIZE: C, SMALL OCCURRENCE. CONDITION: B, GOOD CONDITION. LANDSCAPE CONTEXT: B, WITHIN NATIONAL PARK PRESERVE.

SURVEY DATE: 2002-08-20 LAST OBSERVED: 2002-08-20 FIRST OBSERVED: 2002-08-20

SPECIFIC OCCURRENCE BIOLOGICAL DATA:
[SPACKMAN AND DECKER 2002:] ABOUT 11 PLANTS IN FRUIT.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME: OCCURRENCE WHOLLY CONTAINED?:

MANAGEMENT COMMENTS:
[SPACKMAN AND DECKER 2002:] CURRENT MANAGEMENT APPEARS TO BE FINE. PREDOMINANT LAND USES: HIKING. EXOTIC SPECIES: NONE NOTED IN THIS AREA.

PROTECTION COMMENTS:
[SPACKMAN AND DECKER 2002:] REPORT OCCURRENCE TO NATIONAL PARKS SERVICE STAFF.

OWNER: NATIONAL PARK SERVICE PRESERVE

OWNER COMMENTS:

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

SPACKMAN, S. 2002. SPECIMEN (COLLECTION #SS-02-53.A) TO BE DEPOSITED AT COLORADO STATE UNIVERSITY HERBARIUM.

BEST SOURCE: SPACKMAN, S. AND K. DECKER. 2002. COLORADO NATURAL HERITAGE PROGRAM GREAT SAND DUNES VASCULAR PLANT INVENTORY.

COMMENTS:

BOUNDARIES: N

PHOTOS: N

UPDATE:

PDBRA112B0*020*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

DRABA SMITHII SMITH WHITLOW-GRASS

LOCATORS

PLACE NAME: MOSCA CREEK LAT: 374351N
POTENTIAL CONSERVATION AREA: LONG: 1052913W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: QUADNAME:
Alamosa MOSCA PASS

TOWNSHIP/RANGE: SECTION:
027S073W 01

DIRECTIONS: [SPACKMAN AND DECKER 2002:] ZONE: 13, NORTHING: 4175833, EASTING: 457090. ELEVATION: 9110 FT. [BURT 1999:] ON SOUTH-FACING SLOPE, RIGHT AT EYE LEVEL ALONG TRAIL. [ANDERSON 1973:] MOSCA PASS TRAIL FROM SAND DUNES NATIONAL MONUMENT ABOUT 1 MILE FROM FORK WITH NATURE TRAIL ON ROCKY HILLSIDE. ELEVATION: 7500 FT.

MINIMUM ELEVATION 8440 MAXIMUM ELEVATION: 9100

HABITAT: [SPACKMAN AND DECKER 2002:] GROWING WITH JAMESIA AMERICANA, HOLODISCUS DUMOSUS, AND LICHENS ROSA WOODSII ON ROCKY CLIFF. ELEVATION: 9110 FT. [BURT 1999:] PLANTS GROWING IN ROCK CRACKS ON STEEP, SHADED SOUTH SLOPE. ROCK VOLCANIC. LITTLE OTHER COMPETING VEGETATION. [ANDERSON 1973:] ON ROCKY HILLSIDE. ELEVATION: 7500 FT.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G2 STATE RANK: S2 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: C RANK DATE: 2000-01-24

OCCURRENCE RANK COMMENTS:
[BURT 1999:] RELATIVELY SMALL POPULATION, VERY VULNERABLE TO IMPACTS FROM RECREATIONAL USERS.

SURVEY DATE: 2002-06-25 LAST OBSERVED: 2002-06-25 FIRST OBSERVED: 1973-06-05

SPECIFIC OCCURRENCE BIOLOGICAL DATA:
[SPACKMAN AND DECKER 2002:] ABOUT 40 CLUMPS OBSERVED IN LATE FLOWER AND FRUIT. [BURT 1999:] AT LEAST 100 PLANTS OBSERVED ON TRAIL IN FRUIT IN SEPTEMBER. PLANTS GROWING IN ROCK CRACKS ON CLIFFY, ROCKY SOUTH SLOPE WITH LITTLE OTHER COMPETING VEGETATION. [ANDERSON 1973:] ORIGINAL IDENTIFICATION THLASPI ALPESTRE, CHANGED TO DRABA AUREA, THEN TO DRABA SMITHII.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME: OCCURRENCE WHOLLY CONTAINED?:
ESCALANTE CREEK BLUE SPRUCE FOREST NATURAL ARE Y
RIO GRANDE NATIONAL FOREST Y

MANAGEMENT COMMENTS:
[BURT 1999:] AREA HEAVILY USED BY HIKERS FROM THE GREAT SAND DUNES NATIONAL MONUMENT. PLANTS ARE GROWING RIGHT NEXT TO THE TRAIL AT EYE LEVEL AND ARE VULNERABLE TO HUMAN IMPACTS. PERHAPS EDUCATION OF HIKERS WOULD MINIMIZE IMPACTS.

PROTECTION COMMENTS:

OWNER: USFS, RIO GRANDE NF

OWNER COMMENTS:

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

ANDERSON, BERTA. 1973. SPECIMEN (COLLECTION #1668) AT DENVER BOTANIC GARDENS, KATHRYN KALMBACH HERBARIUM.

BEST SOURCE: SPACKMAN, S. AND K. DECKER. 2002. COLORADO NATURAL HERITAGE PROGRAM FLORISTIC INVENTORY OF GREAT SAND DUNES NATIONAL MONUMENT.

COMMENTS: [SPACKMAN AND DECKER 2002:] 7500 FT ELEVATION REPORTED BY ANDERSON DOES NOT MAKE SENSE BECAUSE THE TRAIL DOES NOT GO THAT LOW. [BURT 1999:] I SAW THIS POPULATION FROM A HORSE AND I DID NOT HAVE MY NOTEBOOK TO TAKE DETAILED INFORMATION. THIS IS WRITTEN FROM MEMORY. MORE EXTENSIVE SURVEY IS DEFINITELY NEEDED. COULD POSSIBLY UPGRADE EO RANK WITH MORE INFORMATION. LOTS OF POTENTIAL HABITAT IN THE AREA.

BOUNDARIES: N

PHOTOS: N

UPDATE:

PDBRA112B0*016*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

CLEOME MULTICAULIS SLENDER SPIDERFLOWER

LOCATORS

PLACE NAME: GREAT SAND DUNES WEST LAT: 374649N
POTENTIAL CONSERVATION AREA: GREAT SAND DUNES LONG: 1053752W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: QUADNAME:
Saguache SAND CAMP

TOWNSHIP/RANGE: SECTION:
041N012E 26

DIRECTIONS: [RONDEAU ET AL. 1997:] T41N R12E S26 NW1/4 NE1/4. 1 MILE NORTHEAST OF INDIAN SPRINGS. THIS IS A WETLAND JUST SOUTH OF THE NATIONAL PARK SERVICE BOUNDARY. DRIVE EITHER THROUGH NATIONAL MONUMENT (NEED PERMISSION) OR THROUGH ZAPATA RANCH (NEED PERMISSION FROM OWNER). NEED 4-WHEEL DRIVE AND MAY NEED TO LET AIR OUT OF TIRES IF SAND IS DRY. ELEVATION: 7600 FEET. ZONE: 13 UTME/X: 444400 UTMN/Y: 4181420.

MINIMUM ELEVATION 7670 MAXIMUM ELEVATION: 7670

HABITAT: [RONDEAU ET AL. 1997:] INTERDUNAL WETLAND ON THE WESTERN EDGE OF [...]. CLEOME MULTICAULIS OCCURS ON THE EDGE OF THE WETLAND IN AN ALKALINE JUNCUS BALTICUS DOMINATED COMMUNITY. CAREX SIMULATA IS DOMINANT IN THE WETTER AND ADJACENT RING. LIGHT EXPOSURE: FULL SUN. MOISTURE: MESIC. PARENT MATERIAL: SAND. SOIL: SANDY LOAM. LANDFORM: WETLAND. DOMINANT PLANT COMMUNITY: JUNCUS BALTICUS. ASSOCIATED TAXA: CAREX SIMULATA. ELEVATION: 7600 FEET.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G2G3 STATE RANK: S2S3 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: C RANK DATE: 1997-06-10

OCCURRENCE RANK COMMENTS:

[RONDEAU ET AL. 1997:] A SMALL POPULATION IN A SMALL WETLAND COMPLEX. VIABILITY: C, WETLAND HAS BEEN HERE SINCE AT LEAST 1930'S, ALTHOUGH ALWAYS SMALL, RECENT STUDIES SHOW THAT THESE INTERDUNAL WETLANDS HAVE BEEN DISAPPEARING. QUALITY: B, SMALL POPULATION BUT NEAR ANOTHER LARGER POPULATION (INDIAN SPRING/BIG SPRING) IS LESS THAN 2 MILES AWAY. CONDITION: B, A FEW NON-NATIVES WITHIN OCCURRENCE.

SURVEY DATE: 1997-06-10 LAST OBSERVED: 1997-06-10 FIRST OBSERVED: 1997-06-10

SPECIFIC OCCURRENCE BIOLOGICAL DATA:

[RONDEAU ET AL. 1997:] FRED BUNCH FROM THE NATIONAL PARK SERVICE TELLS US THAT THEY SAW APPROXIMATELY 50 PLANTS LAST YEAR (AUGUST 1996). NUMBER OF INDIVIDUALS: APPROXIMATELY 50. VEGETATIVE: 100%. FRUIT: 0%. FLOWER: 0%.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME: OCCURRENCE WHOLLY CONTAINED?:

MANAGEMENT COMMENTS:

[RONDEAU ET AL. 1997:] MAY WARRANT YEARLY MONITORING AND EFFECT OF BISON GRAZING. PROTECTION COMMENTS: MAY WANT TO PURSUE CONSERVATION EASEMENT WITH ZAPATA RANCH.

PROTECTION COMMENTS:

OWNER: PRIVATE: ZAPATA RANCH (HISA OTA)

OWNER COMMENTS:

[RONDEAU ET AL. 1997:] OWNER OPERATES THIS PART OF THE RANCH AS A BISON RANCH.

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

BEST SOURCE: RONDEAU, R. J., F. BUNCH, AND J. SANDERSON. 1997. COLORADO NATURAL HERITAGE PROGRAM, SAGUACHE COUNTY INVENTORY.

COMMENTS: [RONDEAU ET AL. 1997:] PHOTOS BY RONDEAU 1997, ROLL 1 FRAMES 26 AND 27. [CNHP:] MAP PROVIDED BY RONDEAU ET AL. 1997.

BOUNDARIES: Y

PHOTOS: Y

UPDATE:

PDCPP03080*043*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

CRYPTANTHA PUSTULOSA CATSEYE

LOCATORS

PLACE NAME: GREAT SAND DUNES NATIONAL
MONUMENT

LAT: 374448N

POTENTIAL CONSERVATION AREA: GREAT SAND DUNES

LONG: 1053032W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: Alamosa
QUADNAME: ZAPATA RANCH

TOWNSHIP/RANGE: SECTION:
026S073W 35

DIRECTIONS: [RONDEAU AND BRYANT 1997:] T26S R13E S35 W1/2. GREAT SAND DUNES NATIONAL MONUMENT, IN VEGETATED SAND DUNES APPROXIMATELY 1/8 TO 1/4 MILE WEST OF PINYON FLATS CAMPGROUND. PARK ALONG 2-TRACK ROAD JUST WEST OF CAMPGROUND OR HIKE FROM CAMPGROUND. ELEVATION: 8200 FEET. ZONE: 13 UTME/X: 455130 UTMN/Y: 4177580. [BEAN 1951:] MONUMENT ROAD JUST BELOW WELLINGTON'S CABIN.

MINIMUM ELEVATION 8120 MAXIMUM ELEVATION: 8200

HABITAT: [RONDEAU AND BRYANT 1997:] OPEN RABBITBRUSH WITH INDIAN RICE GRASS AND NEEDLE AND THREAD GRASS. OPUNTIA POLYCANtha, BOUTELOUA GRACILIS, RHUS TRILOBATA, HETEROTHECA VILLOSA, ASTER SP., ARTEMISIA FRIGIDA, AND SPOROBOLUS CRYPTANDRUS ARE PRESENT WITH A 1 TO 3% COVER. THESE SMALL SAND DUNES ARE PRIMARILY WEST FACING AND DRY. ASPECT: WEST FACING. MOISTURE: XERIC. PARENT MATERIAL: SAND. LANDFORM: VEGETATED SAND DUNES. ELEVATION: 8200 FEET. [RAMALEY 1931:] NEAR SAND DUNES IN PINYON CEDAR WOODLAND IN SANDY LOAM.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G5T? STATE RANK: S1 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: A RANK DATE: 1997-08-10

OCCURRENCE RANK COMMENTS:

[RONDEAU AND BRYANT 1997:] QUALITY: A, LARGE HEALTHY POPULATION WITH MULTIPLE AGE CLASSES. CONDITION: A, HABITAT COMPRISED PRIMARILY OF NATIVES WITH A FEW NON-NATIVES, E.G. BROMUS TECTORUM, FOUND ONLY ALONG ROADSIDE AND EDGE OF TRAIL. VIABILITY: A, POTENTIAL HABITAT IS NUMEROUS. MAY NEED AN OCCASIONAL FIRE TO KEEP PERCENT COVER OF RABBITBRUSH LOW TO MODERATE.

SURVEY DATE: 1997-08-10 LAST OBSERVED: 1997-08-10 FIRST OBSERVED: 1928-06-13

SPECIFIC OCCURRENCE BIOLOGICAL DATA:

[RONDEAU AND BRYANT 1997:] NUMBER OF INDIVIDUALS: ESTIMATED SEVERAL THOUSAND (A LOT MORE POTENTIAL HABITAT IS IN THE AREA AND A MORE THOROUGH SEARCH MAY REVEAL A LARGER POPULATION). FLOWER COLOR: FLOWERS WHITE. APPROX. 100% IN FLOWER AND FRUIT. REPRODUCTIVE SUCCESS APPEARS GOOD. NO EVIDENCE OF DISEASE, PREDATION OR INJURY. THIS PLANT APPEARS TO DO WELL ALONG VEGETATED SAND DUNES AND BECOMES VERY ROBUST IN THE SMALL DRAINAGES, ROAD AND TRAILSIDE THAT RECEIVE EXTRA WATER.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME:

GREAT SAND DUNES NATIONAL MONUMENT

OCCURRENCE WHOLLY CONTAINED?:

Y

MANAGEMENT COMMENTS:

[RONDEAU AND BRYANT 1997:] CURRENT MANAGEMENT PRACTICES ADEQUATE. MAY BE WORTH A LOOK AT THE FIRE HISTORY AND HOW THE PLANT DOES WITH A DENSE COVER OF RABBITBRUSH. PREDOMINANT LAND USES: TRAILS TO SAND DUNES. EXOTIC SPECIES: ONLY ALONG ROAD CUTS, BROMUS TECTORUM, HORDEUM JUBATUM, DESCARNIA. PROTECTION COMMENT: CURRENT PROTECTION ADEQUATE.

PROTECTION COMMENTS:**OWNER:****OWNER COMMENTS:****INFORMATION SOURCES AND RECORD MAINTENENCE****SPECIMEN CITATIONS:**

RONDEAU, R. J. AND R. BRYANT. 1997. SPECIMEN (COLLECTION #97-114) AT COLORADO STATE UNIVERSITY HERBARIUM. RONDEAU, R.J. AND R. BRYANT. 1997. SPECIMEN (COLLECTION #97-114) COLORADO NATIONAL MONUMENT COLLECTION. BEAN, G.T. 1951. SPECIMEN (COLLECTION #51-45) AT UNIVERSITY OF COLORADO HERBARIUM. RAMALEY, F. 1934. SPECIMEN (COLLECTION #14403) AT UNIVERSITY OF COLORADO HERBARIUM. RAMALEY, F. 1931. SPECIMEN (COLLECTION #12927) AT UNIVERSITY OF COLORADO HERBARIUM. RAMALEY, F. 1928. SPECIMEN (COLLECTION #12009) AT UNIVERSITY OF COLORADO HERBARIUM.

BEST SOURCE: RONDEAU, R. J. AND R. BRYANT. 1997. COLORADO NATURAL HERITAGE PROGRAM, SAGUACHE COUNTY INVENTORY.

COMMENTS: [RONDEAU AND BRYANT 1997:] PHOTOS BY RONDEAU 1997 ROLL 6 FRAMES 34-36. [CNHP:] MAP PROVIDED BY RONDEAU AND BRYANT 1997.

BOUNDARIES: Y

PHOTOS: Y

UPDATE:

PDBOR0A3K7*001*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

CRYPTANTHA PUSTULOSA CATSEYE

LOCATORS

PLACE NAME: MEDANO PASS ROAD
POTENTIAL CONSERVATION AREA:

LAT: 374540N
LONG: 1053004W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: Saguache
QUADNAME: LIBERTY

TOWNSHIP/RANGE: SECTION:
026S073W 26

DIRECTIONS: [SPACKMAN 2002:] ZONE: 13, NORTHING: 4179226, EASTING: 455904. MEDANO PASS ROAD, JUST SOUTH OF WHERE ROAD DROPS INTO MEDANO CREEK DRAINAGE. ELEVATION: 8368 FT.

MINIMUM ELEVATION 8368 MAXIMUM ELEVATION: 8368

HABITAT: [SPACKMAN 2002:] GROWING IN SAND MOUNTAIN WITH CHRYSOTHAMNUS, ORYZOPSIS HYMENOIDES, ARTEMESIA FRIGIDA, OPUNTIA, AND YUCCA. ELEVATION: 8368 FT.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G5T? STATE RANK: S1 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: RANK DATE:

OCCURRENCE RANK COMMENTS:

SURVEY DATE: 2002-06-25 LAST OBSERVED: 2002-06-25 FIRST OBSERVED: 2002-06-25

SPECIFIC OCCURRENCE BIOLOGICAL DATA:
[SPACKMAN 2002:] DIFFICULT TO ESTIMATE POPULATION SIZE IN THIS DROUGHT YEAR.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME: OCCURRENCE WHOLLY CONTAINED?:

MANAGEMENT COMMENTS:

PROTECTION COMMENTS:

OWNER: GREAT SAND DUNES NATIONAL PARK
OWNER COMMENTS:

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

SPACKMAN, S. 2002. SPECIMEN (COLLECTION #SS-02-01) TO BE DEPOSITED AT COLORADO
STATE UNIVERSITY HEARBARIUM.

BEST SOURCE: SPACKMAN, S. 2002. COLORADO NATURAL HERITAGE PROGRAM FLORISTIC INVENTORY OF GREAT SAND DUNES NATIONAL
MONUMENT.

COMMENTS:

BOUNDARIES: N

PHOTOS: N

UPDATE:

PDBOR0A3K7*003*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

CRYPTANTHA PUSTULOSA CATSEYE

LOCATORS

PLACE NAME: GREAT SAND DUNES **LAT:** 374404N
POTENTIAL CONSERVATION AREA: **LONG:** 1053050W

MAPPING PRECISION: SECONDS: ACTUAL MAPPED LOCATION OR EQUIVALENT PROVIDED

COUNTY: Alamosa **QUADNAME:** ZAPATA RANCH

TOWNSHIP/RANGE: 027S073W **SECTION:** 02

DIRECTIONS: {SPACKMAN 2002:} T27S R73W S2 NW NW. GREAT SAND DUNES NATIONAL MONUMENT. ALONG TRAIL BETWEEN VISITOR CENTER AND MOSCA CREEK PICNIC AREA. ELEVATION: 8100 FT.

MINIMUM ELEVATION 8100 **MAXIMUM ELEVATION:** 8100

HABITAT: {SPACKMAN 2002:} GROWING IN SPARSE VEGETATED SANDY SOIL. ASSOCIATED SPECIES: HETEROTHECA CANESCENS, TETRADYMIA CANESCENS, CHYSOTHAMNUS GREENEI, AND ERIGERON SPECIES. ELEVATION: 8100 FT.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G5T? **STATE RANK:** S1 **FED. LEGAL:** **STATE LEGAL:**

OCCURRENCE RANK: E **RANK DATE:** 2002-08-21

OCCURRENCE RANK COMMENTS:
{SPACKMAN 2002:} INNSUFFICIENT INFORMATION TO ASSIGN AN ELEMENT OCCURRENCE RANK.

SURVEY DATE: 2002-08-21 **LAST OBSERVED:** 2002-08-21 **FIRST OBSERVED:** 2002-08-21

SPECIFIC OCCURRENCE BIOLOGICAL DATA:
{SPACKMAN 2002:} UNABLE TO ESTIMATE POPULATION SIZE BECAUSE OF DROUGHT.

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME: **OCCURRENCE WHOLLY CONTAINED?:**

MANAGEMENT COMMENTS:
{SPACKMAN 2002:} WORK WITH STAFF AT GREAT SAND DUNES TO ASSURE PROTECTION. FURTHER INVENTORY IS WARRENTED DURING NON-DROUGHT YEAR. PREDOMINANT LAND USE: HIKING.

PROTECTION COMMENTS:
{SPACKMAN 2002:} WORK WITH STAFF AT GREAT SAND DUNES TO ASSURE PROTECTION.

OWNER: NPS

OWNER COMMENTS:

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

SPACKMAN, S. 2002. SPECIMEN (COLLECTION #SS-02-63) TO BE DEPOSITED AT GREAT SAND DUNES HERBARIUM.

BEST SOURCE: SPACKMAN, S. 2002. COLORADO NATURAL HERITAGE PROGRAM FLORISTIC INVENTORY OF GREAT SAND DUNES NATIONAL MONUMENT.

COMMENTS: [CNHP:] MAP PROVIDED BY SPACKMAN 2002.

BOUNDARIES: Y

PHOTOS: N

UPDATE:

PDBOR0A3K7*004*CO

PRINTOUT DATE: 11 JAN 2003

Element Occurrence Record

WOODSIA NEOMEXICANA NEW MEXICO CLIFF FERN

LOCATORS

PLACE NAME: MOSCA PASS
POTENTIAL CONSERVATION AREA:

LAT: 374357N
LONG: 1052956W

MAPPING PRECISION: MINUTES: MAPPED WITHIN CA. 1 MINUTE

COUNTY: Alamosa
QUADNAME: MOSCA PASS

TOWNSHIP/RANGE: SECTION:
027S073W 02

DIRECTIONS: 0.5 MILES EAST OF START OF MOSCA PASS TRAIL. GREAT SAND DUNES NATIONAL MONUMENT; ROCK CREVICES; 8300FT. ELEV.

MINIMUM ELEVATION 8300 MAXIMUM ELEVATION: 8300

HABITAT: ROCK CREVICES, 8300 FT. ELEV.

SPECIES AND SPECIFIC OCCURRENCE STATUS

GLOBAL RANK: G4? STATE RANK: S2 FED. LEGAL: STATE LEGAL:

OCCURRENCE RANK: H RANK DATE: 2000-03-07

OCCURRENCE RANK COMMENTS:
[CNHP:] LAST OBSERVATION IS GREATER THAN 20 YEARS.

SURVEY DATE: LAST OBSERVED: 1954-99-99 FIRST OBSERVED: 1954-99-99

SPECIFIC OCCURRENCE BIOLOGICAL DATA:

MANAGEMENT, OWNERSHIP AND PROTECTION

MANAGEMENT AREA NAME:	OCCURRENCE WHOLLY CONTAINED?:
GREAT SAND DUNES NATIONAL MONUMENT	?
RIO GRANDE NATIONAL FOREST	?
CONEJOS PEAK RANGER DISTRICT	?

MANAGEMENT COMMENTS:

PROTECTION COMMENTS:

OWNER:
OWNER COMMENTS:

INFORMATION SOURCES AND RECORD MAINTENENCE

SPECIMEN CITATIONS:

WEBER. 1954. SPECIMEN (ACCESSION #83427) AT UNIVERSITY OF COLORADO HERBARIUM.

BEST SOURCE: WEBER. 1954. SPECIMEN (ACCESSION # 83427) AT UNIVERSITY OF COLORADO HERBARIUM.

COMMENTS:

BOUNDARIES:

PHOTOS:

UPDATE:

PPDRY0U060*009*CO

PRINTOUT DATE: 11 JAN 2003