



# Vascular Plant Species Discoveries in the Northern Colorado Plateau Network

*Update for 2008–2011*

Natural Resource Technical Report NPS/NCPN/NRTR—2012/582



## ON THE COVER

Trailing four o'clock (*Allionia incarnata*), previously cited as historical from Zion National Park, but relocated by Cheryl Decker in the park in 2008 and photographed by Derrick Zobell in 2010.

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The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

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All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.

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# Executive Summary

In late 2008 and early 2009, the National Park Service (NPS) published a series of annotated vascular plant species checklists for each of the 16 park units in the Northern Colorado Plateau Network (NCPN). These reports were based on reviews of existing herbarium collections and field work associated with rare plant surveys, weed monitoring, vegetation mapping, and general floristic studies conducted from 2004 to 2007.

Since the appearance of these annotated checklists, additional studies have taken place in all 16 network parks, resulting in the discovery of new plant species in each park unit. This report summarizes all of the new species discoveries and changes in status made in each NCPN park from 2008 to 2011.

In just four years, nearly 700 changes to park checklists have been necessary to keep up with new research. Since 2008, 432 new vascular plant species have been added to the floras of the 16 NCPN units. Zion National Park has seen the greatest increase, with 83 new plant taxa, followed by Dinosaur National Monument (57), Pipe Spring National Monument (56), and Bryce Canyon National Park and Cedar Breaks National Monument (both with 41). Over this same time period, the status of another 102 species has been changed. In most cases, species that were formerly classified as reported or historical in a park have been rediscovered and verified by a specimen, photograph, or confirmed observation (although this list also includes a small number of species shown to be falsely reported on further examination). All told, 534 changes have been made to the annotated checklists of the 16 network parks in the last four field seasons (2008–2011). In addition, recent nomenclatural changes have affected 48 Utah species represented by 159 park records.



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We would like to dedicate this publication to the memory of Ann Elder (Dinosaur NM) and Chris Nickel (Hovenweep NM), who helped with many phases of the botanical inventory work in the Northern Colorado Plateau Network.



# 1 Introduction

In late 2008 and early 2009, the National Park Service (NPS) published a series of annotated vascular plant species checklists for each of the 16 park units in the Northern Colorado Plateau Network (NCPN) (Fertig 2009a, 2009b, 2009c, 2009d, 2009e, 2009f; Fertig and Alexander 2008, 2009; Fertig and Atwood 2009; Fertig and Kyte 2009; Fertig and Topp 2009; Fertig et al. 2009a, 2009b; Hogan et al. 2009a, 2009b, 2009c). These reports were based on reviews of existing herbarium collections and field work associated with rare plant surveys, weed monitoring, vegetation mapping, and general floristic studies conducted from 2004 to 2007.

Since the appearance of these annotated checklists, additional studies have taken place in all 16 network parks, resulting in the discovery of new plant species in each park unit. In 2008 alone, 62 new species were documented in nine NCPN parks (Fertig 2008; Fertig et al. 2009c), while another 51 new species were discovered in 2009 (Fertig et al. 2010). In addition, nearly two dozen species previously listed as historical (not seen since 1970) or reported (without a voucher) have been relocated and confirmed as present since 2008.

New discoveries continued in 2010 and 2011. This report summarizes all of the new species discoveries and changes in status made in each NCPN park from 2008 to 2011. In a departure from previous addenda, we have organized new species reports individually by park. We have also included a revised summary table for each park that provides statistics on the number of species confirmed and reported, as well as the numbers of taxa based on life form (e.g., trees, shrubs, perennial forbs, annual grasses) and geographic range patterns (e.g., introduced, local endemic, peripheral, widespread).





## 2 Methods

### 2.1 Status

The status of a species can change based on new information. Using the NPS technical series annotated checklists (see Chapter 5) as a baseline, we were able to determine whether species found during field surveys or cited in recent literature were new to a park or represented a change in status (such as a species formerly considered historical or reported). Additional species reports and supporting data (herbarium specimens, photographs, or location information) were generously provided by park and network biologists and outside researchers. Whenever possible, new specimens were corroborated by one of the authors or an outside expert. Changes in species status (see Table 2-1) were made to a master spreadsheet database and summarized for each park.

### 2.2 Nomenclature

Species nomenclature for this update follows the most current identification manual for each state (Weber and Wittmann 2001 for

Colorado parks, Welsh et al. 2008 for Arizona and Utah parks, Dorn 2001 for Wyoming parks). The original annotated checklists for the 11 Utah park units were based on an earlier edition of *A Utah Flora* (Welsh et al. 2003). The appropriate corrections in nomenclature were made in the 2009 addendum (Fertig et al. 2009c) and are included in Appendix A. Unfortunately, no single reference yet covers the entire flora of the Southwest or intermountain region. Specialists may be disappointed in how their favorite taxonomic group is treated by current state floras. The decision to follow state floras was made at the outset of this project in 2004, in the belief that park staff and researchers would be most familiar with the names and taxonomic concepts being applied at the state level. Future name changes, reduction of species to synonymy, elevation of varieties to full species status, and alteration in family concepts will need to be addressed, especially as the *Intermountain Flora* and *Flora of North America* are completed and can be adopted as alternatives to state-based floras.

**Table 2-1. Categories and descriptions of park status for plant species.**

Number	Category	Description
I	Present in park	Species has been documented as occurring in a park based on a corroborated herbarium specimen (voucher) or photograph taken from within park boundaries since 1970. The species is still presumed to be extant in the park.
II	Present (observed)	Species has been observed within the park since 1970 and the location documented, but a voucher or photograph has not been taken (usually the plant is in too poor of a condition to be vouchered). Species is still presumed to be extant in the park.
III	Extirpated	Species has been collected, photographed, or observed in the park during the past, but has been confirmed to be extirpated.
IV	Historical	Species has been documented in the park with a corroborated herbarium specimen, but has not been observed or relocated since before 1970. It is not known if the species has been extirpated in the park.
V	Reported	Species has been cited as occurring in the park by a reliable literature source, but has not yet been confirmed with a voucher specimen or photograph. Reports are considered reliable if the park is within the expected range of the species or has suitable habitat, or the species is unlikely to be mistaken for another taxon already documented from the area.
VI	False Report	Species has been previously reported for a park in the literature or based on an herbarium specimen, but has been demonstrated to be misidentified.
VII	Questionable	Species has been reported for a park in the literature, but the park is outside of its expected range or lacks suitable habitat, or a more probable look-alike species is already known. No vouchers exist to corroborate presence or a misidentification.
VIII	Potential	Species could occur within the park based on its known distribution or the presence of suitable habitat, but has not yet been documented.



### 3 Results

This chapter summarizes results for each of the 16 network parks. Tables summarizing changes in the flora of each park unit are organized alphabetically by family and species. Additional information is provided on syn-

onyms, common name, life form, geographic range, park status, population size, data source (literature reference or herbarium specimen with collector, collection number, and repository), year documented, and other comments. The tables utilize the following abbreviations (Table 3-1):

**Table 3-1. Key to abbreviations in summary tables.**

Abbreviation	Full name	Description
<b>Life form (Life form)</b>		
AnnF	Annual forb	Non-woody, broad-leaved plants that complete their life cycle in one year
AnnG	Annual graminoid	Grass-like plants that complete their life cycle in one year
Fern	Ferns and fern-allies	Non-flowering vascular plants that reproduce by spores
PerF	Perennial forb	Non-woody, broad-leaved plants that live for multiple years
PerG	Perennial graminoid	Grass-like plants that live for multiple years
Shrub	Shrub	Woody perennials with one to many trunks and usually less than 3.5 m tall
Tree	Tree	Woody perennials with a single stem or trunk over 3.5 m tall
<b>Geographic range (Range)</b>		
Disj	Disjunct	Taxa with their in-state distribution separated from their main, contiguous range by a gap of more than 800 km or 500 miles
Intro	Introduced	Non-native or exotic
LocEn	Local endemic	Taxa with their entire global range restricted to an area of less than 16,500 square km or 1 degree of latitude × 2 degrees of longitude
Periph	Peripheral	Taxa that are widespread globally but occur at the margin of their contiguous range within a state
RegEn	Regional endemic	Taxa with a global range of 16,500–250,000 square km (an area about the size of the state of Wyoming)
Wide	Widespread	Taxa have global ranges exceeding 250,000 square km and occur over at least 10% of the state
<b>Park status (Status)</b>		
FalsRep	False report	
Hist	Historical	
Po	Potential	
Pres	Present in park	See Table 2-1 for descriptions.
Pres (obs)	Present (observed)	
Rep	Reported	
Quest	Questionable	
<b>Population size (Pop size)</b>		
Abund	Abundant	Taxa with large populations, a broad ecological amplitude and dominant in one to several vegetation types, or occurring extensively across a park unit
Com	Common	Taxa with large local populations that may be restricted to a single vegetation type or do not occur across the entire park unit
Rare	Rare	Taxa with low population numbers and restricted to a single location
Unc	Uncommon	Taxa with low to medium-sized populations, a narrow ecological amplitude, or small range across the park unit
Unk	Unknown	Data lacking, usually applied only to reported species

### 3.1 Arches National Park

Since 2008, thirty new vascular plant species have been confirmed or reported for Arches National Park (ARCH) (Tables 3-2, 3-3). These new discoveries were made by park staff, the NCPN vegetation mapping crew (Coles et al. 2009a), and other researchers (Weissinger et al. 2011). Only seven of the new taxa have been verified with herbarium specimens or photographs, while 23 are based on unvouchered reports. Three new species are non-native—pale madwort (*Alyssum alyssoides*), English plantain (*Plantago lanceolata*), and ditch polypogon (*Polypogon interruptus*)—but none is considered noxious by the State of Utah. At least nine of the newly reported species were previously on the park’s potential species list (Fertig et al. 2009a). The most notable addition to the flora of ARCH is the Cisco mariposa (*Calochortus ciscoensis*), a species newly described by Welsh and others (2008) from a type specimen near Cisco, north of the park (Figure 3-1). With these new discoveries, the confirmed and reported flora of ARCH now stands at 551 taxa, an increase of 5.5% since 2007 (Table 3-4).

Alcove rock-daisy (*Perityle specuicola*) was formerly considered present in ARCH, but has now been dropped to the falsely reported list (Table 3-3). This species is known from

cliffs on the south and east side of the Colorado River, just outside the park. A collection from this area by former Southeast Utah Group (SEUG) biologist Charlie Schelz had been mistakenly attributed to ARCH. Potential habitat for this species may exist along cliffs on the north side of the river (within the park), but the species should not be considered a member of the park’s flora until these areas are surveyed.

The “Sleepy Hollow vine,” first reported for ARCH in 2009 (Fertig et al. 2010, p. 12), has been relocated and observed to be locally abundant, but has not yet been found in flower. Based on a reexamination of the material collected by SEUG biologist Mary Moran, it is now thought to represent western hedge-bindweed (*Calystegia sepium* var. *angulata*, rather than maurandya (*Maurandya antirrhiniflora*).

Six additional species reported by Coles and others (2009a) without vouchers are considered questionable here. Each is either well out of its known range, found in habitats not present in ARCH, or probably confused with a look-alike species already known from the park. These taxa include:

- *Asclepias involucrata* (Asclepiadaceae): report probably based on *A. macrosperma*
- *Artemisia ludoviciana* var. *latiloba* (Compositae): montane variety, probably mistaken for *A. ludoviciana* var. *ludoviciana*
- *Grindelia aphanactis* (Compositae): previous reports based on misidentified specimens of *G. fastigiata*
- *Psoralidium junceum* (*Psoralea juncea*) (Leguminosae): outside expected range
- *Calochortus flexuosus* (Liliaceae): outside expected range; report probably based on *C. ciscoensis*
- *Cryptogramma crispa* (*C. acrostichoides*) (Polypodiaceae): suitable habitat not present in ARCH



Figure 3-1. Cisco mariposa (*Calochortus ciscoensis*), newly described by Stanley Welsh and colleagues in 2008 and endemic to northeast Utah and adjacent Colorado. This species was first documented in Arches National Park in 1953, but was included within sego lily (*C. nuttallii*). Both mariposa species are now known from the park. Cisco mariposa can be distinguished from sego lily by its solid white or pinkish petals, which lack a conspicuous, purple triangular patch above the nectary near the inner base of the petal. Photo by W. Fertig from just north of ARCH, May 2010.

Table 3-2. New vascular plant taxa confirmed or reported for Arches National Park, 2008–2011.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Caprifoliaceae (Adoxaceae)	<i>Sambucus racemosa</i>	red elderberry	Shrub	Wide	Rep	Unk	Reported by Weissinger and others (2011).
Caryophyllaceae	<i>Stellaria longifolia</i>	long-leaved starwort	PerF	Sparse	Rep	Unk	Coles and others (2009a). Usually occurs at higher elevations—report may be questionable.
Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>wyomingensis</i> ( <i>Seriphidium tridentatum</i> var. <i>wyomingense</i> )	Wyoming big sagebrush	Shrub	Wide	Rep	Unk	Coles and others (2009a). Previously on potential list.
Compositae (Asteraceae)	<i>Chaenactis douglasii</i> (Includes vars. <i>douglasii</i> & <i>montana</i> )	hoary dusty-maiden	PerF	Wide	Rep	Unk	Coles and others (2009a). Previously on potential list.
Compositae (Asteraceae)	<i>Grindelia squarrosa</i>	curly-cup gumweed	PerF	Wide	Rep	Unk	Coles and others (2009a). Variety not indicated, most likely var. <i>serrulata</i> . Previously on potential list.
Compositae (Asteraceae)	<i>Haplopappus acaulis</i> ( <i>Stenotus acaulis</i> )	stemless goldenweed	PerF	Wide	Rep	Unk	Coles and others (2009a). Variety not indicated. Somewhat out of range, could be mistaken for <i>H. armerioides</i> .
Compositae (Asteraceae)	<i>Iva axillaris</i>	poverty-weed	PerF	Wide	Rep	Unk	Coles and others (2009a). Previously on potential list.
Compositae (Asteraceae)	<i>Machaeranthera canescens</i> var. <i>aristata</i> ( <i>M. linearis</i> , <i>M. rigida</i> , <i>Dieteria canescens</i> var. <i>aristata</i> )	aristate aster	PerF	RegEn	Rep	Com	Coles and others (2009a). Previously on potential list.
Compositae (Asteraceae)	<i>Tetradymia canescens</i>	spineless horsebrush	Shrub	Wide	Rep	Unk	Coles and others (2009a).
*Convulvulaceae	<i>Calystegia sepium</i> var. <i>angulata</i>	western hedge bindweed	PerF	Wide	Pres	Rare	Moran photo (Fertig et al. 2009c, p. 12).
Cruciferae (Brassicaceae)	<i>Alyssum alyssoides</i>	pale madwort	AnnF	Intro	Rep	Unk	Coles and others (2009a). Native to Europe.
Cruciferae (Brassicaceae)	<i>Arabis holboellii</i> var. <i>brachycarpa</i> ( <i>A. divaricata</i> , <i>A. confinis</i> , <i>Boechera brachycarpa</i> , <i>B. divaricata</i> )	spreadingpod rockcross	PerF	Wide	Rep	Unk	Coles and others (2009a).

Table 3-2. New vascular plant taxa confirmed or reported for Arches National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i>	western tansy-mustard	AnnF	Wide	Rep	Com	Coles and others (2009a). Variety not cited, most likely var. <i>intermedia</i> or <i>osmiarum</i> (both previously on potential list).
Cruciferae (Brassicaceae)	<i>Lepidium lasiocarpum</i>	hairy-pod pepperwort	AnnF	Wide	Rep	Unk	Coles and others (2009a). Variety not cited, but most likely var. <i>georginum</i> .
Cruciferae (Brassicaceae)	<i>Physaria newberryi</i>	Newberry's twinpod	PerF	RegEn	Rep	Unk	Coles and others (2009a). Previous reports from ARCH have all been misidentified.
Cyperaceae	<i>Scirpus validus</i> ( <i>Schoenoplectus tabernaemontani</i> , <i>Sch. lacustris</i> var. <i>validus</i> )	soft-stem bulrush	PerG	Wide	Rep	Unk	Coles and others (2009a). Previous reports from ARCH have all been misidentified.
Fagaceae	<i>Quercus</i> × <i>eastwoodiae</i>	Eastwood's oak	Shrub	RegEn	Rep	Unk	Coles and others (2009a) as <i>Q. havardii</i> × <i>gambelii</i> .
Gramineae (Poaceae)	<i>Elymus lanceolatus</i> ( <i>Agropyron dasystachyum</i> )	thickspike wheatgrass	PerG	Wide	Rep	Unk	Coles and others (2009a).
Gramineae (Poaceae)	<i>Festuca ovina</i>	sheep fescue	PerG	Wide	Rep	Unk	Coles and others (2009a). Variety not indicated.
Gramineae (Poaceae)	<i>Polypogon interruptus</i>	ditch polypogon	PerG	Intro	Pres	Unc	Weissinger RW0939291991 ARCH (2010). Native to Eurasia.
Gramineae (Poaceae)	<i>Stipa neomexicana</i> ( <i>Hesperostipa neomexicana</i> )	New Mexico feathergrass	PerG	Wide	Rep	Unk	Coles and others (2009a). Somewhat out of range, could be mistaken for <i>S. speciosa</i> .
Leguminosae (Fabaceae)	<i>Psoralidium lanceolatum</i> var. <i>lanceolatum</i> ( <i>Psoralea lanceolata</i> . Vars. not recognized by some authors)	lemon scurf-pea	PerF	Wide	Pres	Unc	Fertig & Lesica 25562 ARCH (2010). Previously on falsely reported list.
*Liliaceae (Calochortaceae)	<i>Calochortus ciscoensis</i>	Cisco mariposa	PerF	RegEn	Pres	Unc	Welsh & Moore 2051 ARCH (1963).
Onagraceae	<i>Epilobium angustifolium</i> var. <i>canescens</i> ( <i>Chamerion angustifolium</i> )	fireweed	PerF	Wide	Rep	Unk	Coles and others (2009a).
*Plantaginaceae	<i>Plantago lanceolata</i>	English plantain	PerF	Intro	Pres	Unc	Moran s.n. ARCH (2008).
Polemoniaceae	<i>Ipomopsis longiflora</i> ( <i>Gilia longiflora</i> )	longflower gilia	AnnF	Wide	Rep	Unk	Coles and others (2009a).
Polemoniaceae	<i>Ipomopsis pumila</i> ( <i>Gilia pumila</i> )	dwarf gilia	AnnF	Wide	Pres	Unk	Moran s.n. ARCH (2010). Previously on potential list.



**Table 3-2. New vascular plant taxa confirmed or reported for Arches National Park, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Polemoniaceae	<i>Leptodactylon pungens</i> ( <i>Linanthus pungens</i> )	pungent prickly-gilia	Shrub	Wide	Rep	Unk	Coles and others (2009a).
Polygonaceae	<i>Eriogonum cernuum</i>	nodding buckwheat	AnnF	Wide	Pres	Com	Topp ST1004201001 (2010). Variety not indicated, but most likely var. <i>cernuum</i> . Previously on potential list.
Polygonaceae	<i>Cheilanthes feei</i>	slender lip-fern	Fern	Wide	Pres	Rare	Fertig & Lesica 25563 ARCH (2010). Previously on potential list.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-3. Changes in status for Arches National Park species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Compositae (Asteraceae)	<i>Perityle specuicola</i>	alcove rock-daisy	Pres	False Rep	NA	Schelz s.n. specimen cited by Fertig and others (2009a) collected outside of ARCH. Potential habitat present in the park.
Leguminosae (Fabaceae)	<i>Psoralidium lanceolatum</i> var. <i>stenophyllum</i>	slenderleaf scurf-pea	Hist	Pres	Unc	Moran s.n. ARCH (2010).
Liliaceae (Calochortaceae)	<i>Calochortus nuttallii</i>	sego-lily	Rep (Fertig et al. 2009c; originally considered Pres in Fertig et al. 2009a)	Pres	Unc	Topp photograph (2010). There was previously confusion over whether ARCH material belonged to <i>C. nuttallii</i> or the recently described <i>C. ciscoensis</i> . Both species have now been documented in the park.

**Table 3-4. Revised statistical summary of the flora of Arches National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	492	59	551
Full species (excluding varieties and subspecies)	467	53	520
Families	68	2	70
<b>Life Form Diversity</b>			
Tree taxa	16	0	16
Shrub taxa	72	10	82
Perennial forb taxa	206	30	236
Annual forb taxa	97	11	108
Perennial graminoid taxa	71	6	77
Annual graminoid taxa	21	1	22
Fern taxa	9	1	10
<b>Biogeographic Diversity</b>			
Introduced taxa	70	8	78
<b>Native taxa</b>			
Locally endemic taxa	8	0	8
Regionally endemic taxa	66	10	76
Disjunct taxa	0	0	0
Peripheral taxa	8	0	8
Sparse taxa	7	1	8
Widespread taxa	333	40	373
<i>Total native taxa</i>	<i>422</i>	<i>51</i>	<i>473</i>

This table updates Table 3.1 from Fertig and others (2009a) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).



### 3.2 Black Canyon of the Gunnison National Park

Eleven new species have been documented or reported for Black Canyon of the Gunnison National Park (BLCA) since 2008 (Table 3-5). These taxa were all documented by NCPN staff working on the park's vegetation classification (Coles et al. 2010). Crustweed (*Glyptopleura marginata*), in the sunflower family, was also reported as new for the park in 2009 (Fertig et al. 2010), but has since been shown to be a misidentified specimen of dwarf lousewort (*Pedicularis centranthera*, a species already documented in the park flora) (Table 3-6). With these additions, the known and reported flora of BLCA now stands at 543 taxa (Table 3-7), an increase of 2.1% since 2007.

Coles and others (2010) cite 10 additional species for the flora of BLCA that were listed as falsely reported by Hogan and others (2009b, Appendix C as "NCPN (in ed.)"). These species are all unlikely to occur in BLCA due to a lack of suitable habitat, or the park being well outside of their known or expected range. None of these taxa has been vouchered, so positive confirmation is lacking.

David Svendsen, of the NCPN data management team, noted the following errors in the annotated checklist for BLCA (Hogan et al. 2009b):

- *Grindelia squarrosa* var. *squarrosa* (Asteraceae): change to var. *serrulata*
- *Leucantha cyanus* (Asteraceae): should be spelled *Leucacantha cyanus*
- *Ligularia bigelovii* var. *hallii* (Asteraceae): delete variety
- *Boechera demissa* var. *demissa* (Brassicaceae) should be dropped from the potential list (Appendix B)
- *Descurainia pinnata* ssp. *incisa* (Brassicaceae) should be *Descurainia incisa* ssp. *incisa*
- *Sambucus microbotrys* var. *micobotrys* (Caprifoliaceae): delete variety
- *Vicia americana* var. *americana* (Fabaceae): delete variety
- *Persicaria maculata* (Polygonaceae): should be spelled *Persicaria maculosa*
- *Ranunculus inamoenus* var. *inamoenus* (Ranunculaceae): delete variety

**Table 3-5. New vascular plant taxa confirmed or reported for Black Canyon of the Gunnison National Park, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Asteraceae (Compositae)	<i>Chamaechaenactis scaposa</i>	Eastwood plant	PerF	Sparse	Pres	Unc	Topp ST09041101 BLCA (2011).
Asteraceae (Compositae)	<i>Helianthella microcephala</i>	purpledisk sunflower	PerF	RegEn	Pres	Unc	Topp ST09041102 BLCA (2011).
Asteraceae (Compositae)	<i>Machaeranthera bigelovii</i> ( <i>Dieteria bigelovii</i> )	Bigelow's tansy-aster	PerF	Wide	Pres	Unc	Topp ST09041001 BLCA (2010).
Asteraceae (Compositae)	<i>Packera tridenticulata</i> ( <i>Senecio tridenticulata</i> )	three-tooth ragwort	PerF	Wide	Rep	Unk	Coles and others (2010).
Brassicaceae (Cruciferae)	<i>Descurainia pinnata</i> var. <i>nelsonii</i> ( <i>D. nelsonii</i> )	western tansy-mustard	AnnF	Periph?	Rep	Unk	Coles and others (2010).
Brassicaceae (Cruciferae)	<i>Malcolmia africana</i> ( <i>Strigosella africana</i> )	African mustard	AnnF	Intro	Rep	Unk	Coles and others (2010). Previously on potential list. Native to Africa.
Cyperaceae	<i>Carex stenophylla</i> ssp. <i>eleocharis</i> ( <i>C. duriuscula</i> , <i>C. eleocharis</i> )	narrowleaf sedge	PerG	Wide	Rep	Unk	Coles and others (2010). Previously on potential list.
*Fabaceae (Leguminosae)	<i>Lathyrus eucoismus</i> ( <i>L. brachycalyx</i> var. <i>eucoismus</i> )	seemly sweetpea	PerF	Sparse	Rep	Unk	Reported by Trista Crook (2009). Previously on potential list.
Grossulariaceae (Saxifragaceae)	<i>Ribes inerme</i>	whitestem gooseberry	Shrub	Wide	Rep	Unk	Coles and others (2010). Previously on potential list.
Poaceae (Gramineae)	<i>Poa arida</i>	prairie bluegrass	PerG	Wide	Rep	Unk	Coles and others (2010)
Viscaceae	<i>Arceuthobium divaricatum</i>	pinyon dwarf-mistletoe	PerF	Sparse	Pres	Unc	Topp ST09191001 BLCA (2010)

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-6. Changes in status for Black Canyon of the Gunnison National Park species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Compositae (Asteraceae)	<i>Glyptopleura marginata</i>	crustweed	Pres (Fertig et al. 2010)	False Rep	NA	Crook TC07250901 BLCA (2009) is a misidentified specimen of <i>Pedicularis centranthera</i> .

**Table 3-7. Revised statistical summary of the flora of Black Canyon of the Gunnison National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	474	69	543
Full species (excluding varieties and subspecies)	469	67	536
Families	87	3	90
<b>Life Form Diversity</b>			
Tree taxa	13	1	14
Shrub taxa	53	10	63
Perennial forb taxa	246	37	283
Annual forb taxa	73	12	85
Perennial graminoid taxa	73	8	81
Annual graminoid taxa	4	1	5
Fern taxa	12	0	12
<b>Biogeographic Diversity</b>			
Introduced taxa	63	11	74
<b>Native taxa</b>			
Locally endemic taxa	12	1	13
Regionally endemic taxa	30	6	36
Disjunct taxa	1	0	1
Peripheral taxa	7	5	12
Sparse taxa	4	1	5
Widespread taxa	357	45	402
<i>Total native taxa</i>	<i>411</i>	<i>58</i>	<i>469</i>

This table updates Table 3.1 from Hogan and others (2009b) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Weber and Witmann (2001).

### 3.3 Bryce Canyon National Park

In the past four years, wetland vegetation surveys by Terri Hildebrand and students from Southern Utah University and the NCPN vegetation mapping team (Tendick et al. 2011a) have netted 41 new vascular plant species for Bryce Canyon National Park (BRCA) (Table 3-8). Another three species previously reported for the park have now been confirmed with voucher specimens (Table 3-9). At least 26 of the new records for BRCA are based on species previously on the park's potential species list (Fertig and Topp 2009, Appendix B). Among the new species are two non-native taxa: blue mustard (*Chorispora tenella*) and bulbous bluegrass (*Poa bulbosa*). The latter species is rapidly expanding in southern Utah and can be extremely invasive. It is of potential management concern and difficult to eradicate because it reproduces by root offsets and asexual bulblets. The flora of BRCA now stands at 628 taxa (Table 3-10), an increase of 7% since 2007.

Tendick and others (2011a) cite the following 11 species as also occurring in the park. We consider these species questionable, as BRCA lacks suitable habitat, is located well outside their known distribution, or more plausible look-alike species are already known from within the park. Four of the taxa were previously listed as "falsely reported" (Fertig and Topp 2009, Appendix C) and none has been vouchered from the park. The rejected species include:

- *Cryptantha osterhoutii* (Boraginaceae): well out of expected range; more likely to be *Cryptantha abata*, *C. humilis*, or *C. ochroleuca*
- *Arenaria fendleri* var. *fendleri* (Caryophyllaceae): previous reports were based on *A. fendleri* var. *glabrescens*
- *Physaria newberryi* (Cruciferae): all previous reports based on *P. intermedia* or *P. rubicundula*; may also represent *P. chambersii* var. *membranacea*
- *Carex geayeri* (Cyperaceae): outside expected range
- *Carex raynoldsii* (Cyperaceae): outside expected range
- *Gentianella amarella* (Gentianaceae): previous reports based on *G. heterosepala*
- *Stipa neomexicana* (Gramineae): unlikely due to lack of suitable habitat
- *Smilacina racemosa* (Liliaceae): outside expected range
- *Zigadenus venenosus* (Liliaceae): outside expected range; probably *Z. paniculatus*
- *Salix glauca* (Salicaceae): outside expected range; suitable habitat probably not present
- *Cymopterus acaulis* (Umbelliferae): outside expected range; reports more likely to be *Cymopterus minimus* or *C. purpureus*.

**Table 3-8. New vascular plant taxa confirmed or reported for Bryce Canyon National Park, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Boraginaceae	<i>Mertensia fusiformis</i> (Included in <i>M. oblongifolia</i> by some authors)	spindle-rooted bluebell	PerF	RegEn	Pres	Unc	Hildebrand 3640 (2011). Previously on potential list.
Caprifoliaceae	<i>Sambucus racemosa</i> var. <i>microbotrys</i> ( <i>S. microbotrys</i> , included in <i>S. racemosa</i> var. <i>racemosa</i> by some authors)	red elderberry	Shrub	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Compositae (Asteraceae)	<i>Agoseris glauca</i> var. <i>dasycephala</i>	short agoseris	PerF	Wide	Pres	Unc	Murray 9 (2011). Previously on potential list.
Compositae (Asteraceae)	<i>Artemisia bigelovii</i>	Bigelow's sagebrush	Shrub	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Compositae (Asteraceae)	<i>Artemisia ludoviciana</i> var. <i>ludoviciana</i>	Louisiana wormwood	PerF	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>vaseyana</i> ( <i>Seriphidium vaseyanum</i> . Includes <i>A. tridentata</i> var. <i>pauciflora</i> )	mountain big sagebrush	Shrub	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Compositae (Asteraceae)	<i>Aster foliaceus</i> ( <i>Symphotrichum foliaceum</i> )	spruce aster	PerF	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list. Var. not given, but probably var. <i>apricus</i> .
Compositae (Asteraceae)	<i>Bahia dissecta</i> ( <i>Amauriopsis dissecta</i> )	cutleaf	PerF	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Compositae (Asteraceae)	<i>Erigeron caespitosus</i>	tufted fleabane	PerF	Wide	Rep	Unk	Tendick and others (2011a). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Erigeron formosissimus</i>	beautiful daisy	PerF	Wide	Pres	Unc	Hildebrand 3890 (2011). Previously on potential list.
Compositae (Asteraceae)	<i>Helianthus petiolaris</i> var. <i>fallax</i>	prairie sunflower	AnnF	Wide	Rep	Unk	Tendick and others (2011a).
Compositae (Asteraceae)	<i>Solidago multiradiata</i> var. <i>scopolorum</i> (Vars. not recognized in <i>FNA</i> )	Rocky Mountain goldenrod	PerF	Wide	Pres	Unc	Hildebrand 4025 (2011). Previously on potential list.
Compositae (Asteraceae)	<i>Stephanomeria exigua</i>	white-plume wirelettuce	AnnF	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Cruciferae (Brassicaceae)	<i>Caulanthus crassicaulis</i> var. <i>major</i> ( <i>C. major</i> )	slender wild cabbage	PerF	Disj	Pres	Unc	Hildebrand 3837 (2011). Type locality: Bromide Pass, Henry Mts, Garfield Co. (Jones 5685).
Cruciferae (Brassicaceae)	<i>Chorispora tenella</i>	blue mustard	AnnF	Intro	Pres	Unc	Hildebrand 3824 (2011). Native to Asia. Previously on potential list.

Table 3-8. New vascular plant taxa confirmed or reported for Bryce Canyon National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Cruciferae (Brassicaceae)	<i>Lepidium virginicum</i> var. <i>pubescens</i> ( <i>L. virginicum</i> ssp. <i>menziesii</i> )	poor-man's peppermint	AnnF	Wide	Pres	Unc	Hildebrand 3820 (2011).
Cruciferae (Brassicaceae)	<i>Streptanthella longirostris</i>	long-beak fiddle-mustard	AnnF	Wide	Rep	Unk	Tendick and others (2011a).
Cyperaceae	<i>Carex occidentalis</i>	western sedge	PerG	Wide	Pres	Com	Hildebrand 3856 (2011). Also cited by Tendick and others (2011a). Previously on potential list.
Cyperaceae	<i>Carex scirpoidea</i> var. <i>scirpoidea</i>	slender sedge	PerG	Sparse	Pres	Rare	Hildebrand 3870 (2011).
Cyperaceae	<i>Carex simulata</i>	analogue sedge	PerG	Wide	Pres	Unc	Hildebrand 3904 (2011). Also cited by Tendick and others (2011a). Previously on potential list.
Gramineae (Poaceae)	<i>Phalaris arundinacea</i> ( <i>Phalaroides arundinacea</i> )	reed canary grass	PerG	Wide	Pres	Unc	Hildebrand 3935 (2011). Previously on potential list.
Gramineae (Poaceae)	<i>Poa bulbosa</i>	bulbous bluegrass	PerG	Intro	Pres	Unc	Hildebrand 3827 (2011). Native to Eurasia.
Hydrophyllaceae	<i>Phacelia crenulata</i> var. <i>corrugata</i> ( <i>P. corrugata</i> )	corrugate phacelia	AnnF	Wide	Rep	Unk	Tendick and others (2011a).
Juncaceae	<i>Juncus ensifolius</i> var. <i>montanus</i> ( <i>J. saximontanus</i> , <i>J. tracyi</i> , <i>J. xiphoides</i> )	mountain rush	PerG	Wide	Pres	Unc	Hildebrand 3939 (2011). Previously on potential list.
Juncaceae	<i>Juncus tenuis</i> ( <i>J. dudleyi</i> )	poverty rush	PerG	Wide	Rep	Unk	Tendick and others (2011a).
Juncaginaceae	<i>Triglochin concinna</i> (Included in <i>T. maritimum</i> by some authors)	low arrowgrass	PerG	Wide	Pres	Unc	Hildebrand 3879 (2011).
Leguminosae (Fabaceae)	<i>Lathyrus lanszwertii</i> var. <i>laetivirens</i> ( <i>L. laetivirens</i> )	largeflower sweetpea	PerF	RegEn	Pres	Unc	Hildebrand 3639 (2011). Previously on potential list.
Liliaceae (Melanthiaceae)	<i>Zigadenus paniculatus</i> ( <i>Toxicoscordion paniculatum</i> )	foothills death camas	PerF	Wide	Pres	Unc	Hildebrand 3830 (2011). Previously on potential list.
Malvaceae	<i>Iliamna rivularis</i>	wild hollyhock	PerF	Wide	Pres	Unc	Topp ST08071101 BRCA (2011).
Onagraceae	<i>Epilobium ciliatum</i> ( <i>E. ciliatum</i> var. <i>cliatum</i> , <i>E. watsonii</i> , <i>E. adenocaulon</i> )	northern willow-herb	PerF	Wide	Rep	Unk	Tendick and others (2011a). Previously on falsely reported list.
Onagraceae	<i>Gayophytum decipiens</i>	deceptive groundsmoke	AnnF	Wide	Pres	Unc	Hildebrand 4035 (2011). Previously on potential list.
Pinaceae	<i>Abies lasiocarpa</i> ( <i>Abies bifolia</i> )	subalpine fir	Tree	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.

**Table 3-8. New vascular plant taxa confirmed or reported for Bryce Canyon National Park, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Pinaceae	<i>Picea engelmannii</i>	Engelmann spruce	Tree	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Polemoniaceae	<i>Microsteris gracilis</i> var. <i>humilior</i> ( <i>Phlox gracilis</i> sp. <i>humilior</i> )	slender phlox	AnnF	Wide	Pres	Unc	Hildebrand 3669 (2011). Previously on potential list.
Polygonaceae	<i>Rumex occidentalis</i> ( <i>R. aquaticus</i> var. <i>fenestratus</i> , <i>R. aquaticus</i> sp. <i>occidentalis</i> )	western dock	PerF	Wide	Pres	Unc	Hildebrand 3940 (2011). Previously on potential list.
Rosaceae	<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	Shrub	Wide	Rep	Unk	Tendick and others (2011a). Previously on potential list.
Rosaceae	<i>Potentilla gracilis</i> var. <i>elmeri</i> ( <i>P. pectinisecta</i> )	combleaf cinquefoil	PerF	Wide	Pres	Unc	Hildebrand 3871 (2011). Also cited by Tendick and others (2011a) without var.
Scrophulariaceae	<i>Veronica peregrina</i> var. <i>xalapensis</i>	purslane speedwell	AnnF	Wide	Pres	Unc	Hildebrand 4019 (2011). Previously on potential list.
Umbelliferae (Apiaceae)	<i>Cymopterus hendersonii</i> ( <i>C. longilobus</i> , <i>Pteryxia hendersonii</i> )	mountain spring-parsley	PerF	Wide	Pres	Unc	Hildebrand 3652 (2011).
Umbelliferae (Apiaceae)	<i>Osmorhiza depauperata</i>	blunt sweet-cicely	PerF	Wide	Pres	Unc	Hildebrand 3812 (2011). Previously on potential list.
Valerianaceae	<i>Valeriana occidentalis</i>	western valerian	PerF	Wide	Pres	Unc	Hildebrand 3795 (2011).

**Table 3-9. Changes in status for Bryce Canyon National Park species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Chenopodiaceae	<i>Chenopodium atrovirens</i>	mountain goosefoot	Hist	Pres	Unc	Hildebrand 3811 (2011).
Cruciferae (Brassicaceae)	<i>Arabis drummondii</i>	Drummond's rockcress	Rep	Pres	Unc	Hildebrand 3855 (2011).
Cruciferae (Brassicaceae)	<i>Arabis holboellii</i> var. <i>pinetorum</i>	Holboell's rockcress	Hist	Pres	Com	Hildebrand 3668 (2011). Specimen is in flower; identification to variety tentative.
Cyperaceae	<i>Carex nebrascensis</i>	Nebraska sedge	Rep	Pres	Unc	Hildebrand 4015 (2011).
Geraniaceae	<i>Geranium richardsonii</i>	Richardson's cranes-bill	Rep	Pres	Unc	Hildebrand 4026 (2011).
Liliaceae (Alliaceae)	<i>Allium bisceptrum</i>	twincrest onion	Hist	Pres	Unc	Hildebrand 3942 (2011).

**Table 3-10. Revised statistical summary of the flora of Bryce Canyon National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	581	47	628
Full species (excluding varieties and subspecies)	551	38	589
Families	73	0	73
<b>Life Form Diversity</b>			
Tree taxa	18	2	20
Shrub taxa	72	6	78
Perennial forb taxa	331	26	357
Annual forb taxa	63	10	73
Perennial graminoid taxa	85	3	88
Annual graminoid taxa	7	0	7
Fern taxa	5	0	5
<b>Biogeographic Diversity</b>			
Introduced taxa	60	2	62
<b>Native taxa</b>			
Locally endemic taxa	19	3	22
Regionally endemic taxa	47	4	51
Disjunct taxa	4	0	4
Peripheral taxa	2	0	2
Sparse taxa	11	0	11
Widespread taxa	438	38	476
<i>Total native taxa</i>	521	45	566

This table updates Table 3.1 from Fertig and Topp (2009) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).



### 3.4 Canyonlands National Park

National Park Service staff scientists and other researchers (Tendick et al. 2012 in prep.) have added 33 plant species to the known flora of Canyonlands National Park (CANY) since 2008 (Table 3-11). At least 16 of those species were previously listed as “potential” for the park (Fertig et al. 2009b, Appendix B). Another four species that were formerly reported for the park (without vouchers) have since been confirmed as being present (Table 3-12). One of the new species records, pepperwort, (*Marsilea vestita*) represents a new family (Marsileaceae) for the park. With these additions, the flora of CANY now stands at 627 confirmed and reported species (Table 3-13), an increase of 5.6% over the last four years.

The NCPN vegetation mapping team has reported another 30 species for CANY that are considered questionable here (Tendick et al. 2012 in prep.). These taxa (listed below) are excluded primarily because CANY lacks suitable habitat or is outside the species’ predicted range. Herbarium vouchers or photographs are needed to confirm their presence in the park.

- *Lithospermum multiflorum* (Boraginaceae): suitable habitat not present; report probably based on *L. incisum*
- *Tiquilia hispidissima* (Boraginaceae): synonym of *Tiquilia latior*
- *Opuntia whipplei* (Cactaceae): difficult to mistake, though CANY is outside expected range; confirmation needed
- *Symphoricarpos oreophilus* (Caprifoliaceae): suitable habitat largely absent
- *Arenaria fendleri* var. *fendleri* (Caryophyllaceae): outside expected range; reports probably based on var. *eastwoodiae*
- *Corispermum villosum* (Chenopodiaceae): Previous reports (Albee et al. 1988) are now thought to represent *C. americanum* (already on CANY present list)
- *Antennaria parvifolia* (Compositae): previous reports based on *A. marginata*; suitable habitat probably lacking
- *Brickellia grandiflora* (Compositae): suitable habitat probably lacking; report may be based on *B. californica*
- *Erigeron uintahensis* (Compositae): outside of expected range; suitable habitat lacking
- *Haplopappus acaulis*: (Compositae) outside expected range; reports probably based on *H. armerioides*
- *Hymenoxys acaulis* var. *arizonica* (Compositae): previous reports based on var. *ivesiana*
- *Machaeranthera canescens* var. *glabra* (Compositae): included in *M. canescens* var. *aristata* by Welsh and others (2008)
- *Arabis hirsuta* (Cruciferae): outside expected range
- *Chamaesyce albomarginata* (Euphorbiaceae): outside expected range; report probably based on *C. fendleri*
- *Calamagrostis canadensis* (Gramineae): suitable habitat not present; probably based on *C. scopulorum*
- *Elymus spicatus* (Gramineae): suitable habitat lacking
- *Festuca ovina* (Gramineae): suitable habitat lacking
- *Poa annua* (Gramineae): outside expected range; suitable habitat lacking
- *Stipa lettermanii* (Gramineae): outside expected range; suitable habitat lacking
- *Swertia albomarginata* (Gentianaceae): previous reports based on *S. utahensis*
- *Astragalus convallarius* var. *convallarius* (Leguminosae): somewhat out of range; report more likely to be *A. episcopus*
- *Psoralidium tenuiflorum* (Leguminosae): cited as questionable (Fertig et al. 2009b)
- *Zigadenus elegans* (Liliaceae): usually a montane species; previous reports have all been *Z. vaginatus*
- *Ipomopsis congesta* (Polemoniaceae): previous reports based on *I. pumila*
- *Phlox austromontana* (Polemoniaceae): previous report based on *P. hoodii*
- *Amelanchier alnifolia* (Rosaceae): previous reports based on *A. utahensis*
- *Peraphyllum ramosissimum* (Rosaceae): usually a montane species, confirmation needed

- *Potentilla biennis* (Rosaceae): previous reports based on *P. paradoxa*; outside expected range
- *Populus angustifolia* (Salicaceae): usually found in montane habitats; reports may be based on *P. × intercurrents*
- *Penstemon barbatus* (Scrophulariaceae): suitable habitat not present.

**Table 3-11. New vascular plant taxa confirmed or reported for Canyonlands National Park, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Cactaceae	<i>Opuntia fragilis</i>	brittle prickly-pear	PerF	Wide	Pres	Unc	Hodgson 23988 DES (2009). Previously on falsely reported list.
Chenopodiaceae	<i>Chenopodium desiccatum</i> ( <i>C. pratericola</i> )	desert goosefoot	AnnF	Sparse	Rep	Unc	Tendick and others (2012). Previously on potential list.
Chenopodiaceae	<i>Chenopodium rubrum</i> var. <i>rubrum</i>	red goosefoot	AnnF	Wide	Pres	Unc	Moran & Miller s.n. CANY (2010).
Chenopodiaceae	<i>Suaeda calceoliformis</i>	broom seepweed	AnnF	Wide	Rep	Unc	Tendick and others (2012).
Compositae (Asteraceae)	<i>Bidens frondosa</i>	devil's beggarsticks	PerF	Wide	Pres	Unc	Moran & Miller s.n. CANY (2010). Previously on potential list.
Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>wyomingensis</i> ( <i>Serophidium tridentatum</i> var. <i>wyomingense</i> )	Wyoming big sagebrush	Shrub	Wide	Rep	Unc	Tendick and others (2012). Previously on potential list.
Compositae (Asteraceae)	<i>Chrysothamnus pulchellus</i> var. <i>baileyi</i> ( <i>C. baileyi</i> , <i>Ericameria pulchella</i> )	pretty rabbitbrush	Shrub	Periph	Rep	Unc	Tendick and others (2012). Previously on potential list.
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>lanceolatus</i>	lanceleaf rabbitbrush	Shrub	Wide	Rep	Unc	Tendick and others (2012). Previously on potential list.
Compositae (Asteraceae)	<i>Cirsium undulatum</i> var. <i>undulatum</i>	wavy-leaved thistle	PerF	Wide	Pres	Unc	Moran s.n. CANY (2011). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Grindelia aphanactis</i> ( <i>G. nuda</i> var. <i>aphanactis</i> )	Rydberg's gum-weed	PerF	Periph	Pres	Rare	Rink 4613 NAU (2005). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Helianthus anomalus</i> (includes <i>H. deserticola</i> )	sand sunflower	AnnF	RegEn	Rep	Unc	Tendick and others (2012). Previously on potential list.
Cruciferae (Brassicaceae)	<i>Alyssum alyssoides</i>	pale madwort	AnnF	Intro	Rep	Unc	Tendick and others (2012). Previously on falsely reported list. Native to Europe.
Cyperaceae	<i>Carex hystrix</i>	bottlebrush sedge	PerG	Wide	Pres	Unc	Moran s.n. CANY (2011). Previously on potential list.
Euphorbiaceae	<i>Chamaesyce serpyllifolia</i> ( <i>Euphorbia serpyllifolia</i> )	thyme-leaved spurge	AnnF	Wide	Pres	Unc	Harms s.n. NAU (2003). Previously on potential list.
Fagaceae	<i>Quercus</i> × <i>eastwoodiae</i>	Eastwood's oak	Shrub	RegEn	Rep	Unc	Tendick and others (2012). Previously on potential list. Hybrid of <i>Quercus gambelii</i> × <i>Q. Welshii</i> .
Gramineae (Poaceae)	<i>Alopecurus aequalis</i>	shortawn foxtail	PerG	Wide	Pres	Unc	Moran & Miller s.n. CANY (2011).

Table 3-11. New vascular plant taxa confirmed or reported for Canyonlands National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Gramineae (Poaceae)	<i>Aristida arizonica</i>	Arizona threewawn	AnnG	Periph	Rep	Unk	Tendick and others (2012). Previously on falsely reported list.
*Gramineae (Poaceae)	<i>Bothriochloa ischaemum</i> ( <i>B. ischaemum</i> var. <i>songarica</i> )	yellow bluestem	PerG	Intro	Pres	Unk	Moran s.n. CANY (2008). Previously on potential list.
Gramineae (Poaceae)	<i>Chloris virgata</i>	feather finger grass	AnnG	Wide	Pres	Unc	Moran s.n. CANY (2011).
Gramineae (Poaceae)	<i>Elymus cinereus</i> ( <i>Leymus cinereus</i> )	Great Basin wildrye	PerG	Wide	Rep	Unk	Tendick and others (2012). Previously on potential list.
Gramineae (Poaceae)	<i>Elymus repens</i> ( <i>Agropyron repens</i> , <i>Elytrigia repens</i> )	quackgrass	PerG	Intro	Rep	Unk	Tendick and others (2012). Native to Eurasia. Utah state noxious weed.
*Gramineae (Poaceae)	<i>Eragrostis hypnoides</i>	teal lovegrass	AnnG	Periph	Pres	Unk	Moran s.n. CANY (2008).
Gramineae (Poaceae)	<i>Poa pratensis</i>	Kentucky bluegrass	PerG	Intro	Rep	Unk	Tendick and others (2012). Native to Europe.
Juncaceae	<i>Juncus bufonius</i>	toad rush	AnnG	Wide	Pres	Unc	Schelz s.n. CANY (2005). Previously on potential list.
*Labiatae (Lamiaceae)	<i>Mentha arvensis</i> var. <i>glabrata</i> ( <i>M. arvensis</i> var. <i>canadensis</i> )	field mint	PerF	Wide	Pres	Unk	Moran s.n. CANY (2008). Previously on potential list.
Leguminosae (Fabaceae)	<i>Caesalpinia repens</i> ( <i>Hoffmanseggia repens</i> )	creeping rushpea	PerF	RegEn	Rep	Unk	Tendick and others (2012). Previously on potential list.
Marsilieceae	<i>Marsilea vestita</i>	pepperwort	Fern	Wide	Pres	Unc	Moran & Miller s.n. CANY (2011). First reported by Schelz and others (2006), but mistakenly treated as questionable.
*Onagraceae	<i>Oenothera howardii</i> ( <i>O. brachycarpa</i> )	bronze evening-primrose	PerF	Wide	Pres	Unk	Moran s.n. CANY (2008).
Polygonaceae	<i>Polygonum amphibium</i> ( <i>Polygonum amphibium</i> var. <i>emersum</i> , <i>Po. coccineum</i> , <i>Persicaria coccinea</i> , <i>Pe. amphibia</i> )	water smartweed	PerF	Wide	Pres	Unc	Miller & Moran s.n. CANY (2010).
*Polygonaceae	<i>Polygonum lapathifolium</i> ( <i>Persicaria lapathifolia</i> )	willow-weed	AnnF	Intro	Pres	Unc	Moran & Miller s.n. CANY (2010). Reported for CANY by Fertig and others (2009), voucher taken in 2010 and upgraded to Present. Native to Eurasia.

**Table 3-11. New vascular plant taxa confirmed or reported for Canyonlands National Park, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Polygonaceae	<i>Polygonum persicaria</i> ( <i>Persicaria maculosa</i> )	lady's-thumb	AnnF	Intro	Rep	Unk	Moran s.n. CANY (2008) specimen fragmentary—confirmation needed. Native to Eurasia.
Rosaceae	<i>Purshia tridentata</i>	antelope bitterbrush	Shrub	Wide	Rep	Unk	Tendick and others (2012). Previously on potential list.
Scrophulariaceae	<i>Mimulus rubellus</i>	reddish monkeyflower	AnnF	Wide	Pres	Unc	Moran s.n. CANY(2010). Previously on potential list.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-12. Changes in status for Canyonlands National Park species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Amaranthaceae	<i>Amaranthus albus</i>	tumble pigweed	Rep	Pres	Unc	Harms s.n. NAU (2003).
Compositae (Asteraceae)	<i>Haplopappus rusbyi</i>	Rusby's goldenweed	Rep	Pres	Unc	Miller & Moran s.n. CANY (2010).
Liliaceae	<i>Zigadenus paniculatus</i>	foothills death camas	Rep	Pres	Unc	Topp ST0531201001 CANY (2010).
*Scrophulariaceae	<i>Verbascum thapsus</i>	woolly mullein	Rep	Pres	Unk	Moran s.n. CANY (2008). Native to Eurasia.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-13. Revised statistical summary of the flora of Canyonlands National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	556	71	627
Full species (excluding varieties and subspecies)	532	64	596
Families	71	2	73
<b>Life Form Diversity</b>			
Tree taxa	15	5	20
Shrub taxa	86	12	98
Perennial forb taxa	247	26	273
Annual forb taxa	104	13	117
Perennial graminoid taxa	75	13	88
Annual graminoid taxa	20	2	22
Fern taxa	9	0	9
<b>Biogeographic Diversity</b>			
Introduced taxa	53	20	73
<b>Native taxa</b>			
Locally endemic taxa	15	1	16
Regionally endemic taxa	83	11	94
Disjunct taxa	0	0	0
Peripheral taxa	14	6	20
Sparse taxa	4	4	8
Widespread taxa	387	29	416
<i>Total native taxa</i>	503	51	554

This table updates Table 3.1 from Fertig and others (2009b) and Table 4 from Fertig and others (2009c) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.5 Capitol Reef National Park

Fieldwork by NCPN vegetation mappers (Clark et al. 2009) and other researchers since 2008, and a review of recent literature (Clark 2009), have added 22 new vascular plant species to the flora of Capitol Reef National Park (CARE) (Table 3-14). Of the new species, six have been confirmed with vouchers and 16 are reported. Eleven of the new reports were species previously considered falsely reported and five were on the park's potential species list (Fertig 2009a, Appendix C and B). One other species formerly cited as reported has now been confirmed as present (Table 3-15). With the addition of these new species, the documented and reported flora of CARE is now 909 taxa (Table 3-16). This represents an increase of 2.5% from the flora known in 2007.

Only two new exotic species have been added to the flora over the last four years. Of these, meadow fescue (*Festuca pratensis*) has the greatest potential to become invasive, especially in riparian areas.

Two of the new native species for the park are local endemics of the San Rafael Swell. Bolander's camissonia *Camissonia bolanderi* was recently described as a new species to science by Atwood and Welsh (2007). A duplicate of a Ken Heil collection from CARE housed at the Brigham Young University herbarium has been annotated as *C. bolanderi* (Welsh et al. 2008). The status of this species remains poorly known, and it has recently been added to the Utah state sensitive plant list of the Bureau of Land Management. Johnston's cryptanth (*Cryptantha johnstonii*) had previously been documented for the park but specimens in the CARE herbarium appeared to be misidentified (Fertig 2009a, Appendix C). Debi Clark includes this species in her recent book *Capitol Reef Wildflowers* (Clark 2009), with a note that it is "found in the northern portion of the park on gypsum soils with well-developed biological soil crusts." She also includes a photo, though the image shows a flowering plant and not the diagnostic fruits. Better confirmation of this report is still needed.

Several additional species reported for CARE by the NCPN vegetation mapping group (Clark et al. 2009) have been excluded here because the park lacks suitable habitat,

is well outside the known or expected range of the species, or a more probable look-alike species is already known. Until vouchers are secured to corroborate their presence, the status of these species should be considered questionable. These taxa include:

- *Coryphantha vivipara* var. *vivipara* (Cactaceae): more likely to be var. *arizonica*
- *Corispermum villosum* (Chenopodiaceae): more likely to be *C. americanum*
- *Erigeron annuus* (Compositae): outside of expected range
- *Tetradymia nuttallii* (Compositae): outside of expected range; previous reports have been *T. spinosa*
- *Xylorhiza glabriuscula* (Compositae): outside of expected range; more likely to be *Xylorhiza confertifolia* or *X. venusta*
- *Ephedra nevadensis* (Ephedraceae): previous reports have been *E. viridis* var. *viridis*; somewhat out of range
- *Arctostaphylos pungens* (Ericaceae): outside of expected range; more likely to be *A. patula*
- *Nama demissum* (Hydrophyllaceae): outside of expected range; report may be based on *N. retrorsum*
- *Sisyrinchium halophilum* (Iridaceae): well outside of expected range; probably misidentified *S. demissum*
- *Astragalus castaneiformis* (Leguminosae): well outside of expected range; previous reports all based on *A. consobrinus*
- *Allium textile* (Liliaceae): unlikely; readily confused with *A. macropetalum*
- *Ipomopsis congesta* var. *congesta* (Polemoniaceae): outside of expected range; report may be based on var. *frutescens*
- *Phlox muscoides* (Polemoniaceae): commonly mistaken for *Leptodactylon caespitosum*
- *Eriogonum corymbosum* var. *revealianum* (Polygonaceae): previous reports all based on the recently described var. *heilii*
- *Eriogonum maculatum* (Polygonaceae): well outside of expected range



- *Fragaria vesca* (Rosaceae) outside of expected range; report probably based on *F. virginiana*
- *Penstemon lentus* (Scrophulariaceae): outside expected range
- *Penstemon strictiformis* (Scrophulariaceae) outside expected range; previous reports all based on *P. scariosus* var. *scariosus*.

In addition, four species included in Clark (2009) have been excluded. Mojave woody-aster (*Xylorhiza tortifolia*) is now considered a Mohave endemic and known only from the St. George area in Utah (Welsh et al. 2008). The photo in Clark's book depicts hurtleaf

woodyaster (*X. imberbis*; *X. tortifolia* var. *imberbis*), a species already documented for the park. The photo of Hopi-tea (*Thelesperma megapotamicum*) in the book appears to be a rayless form of scapose greenthread (*T. subnudum* var. *subnudum*), which is also already known from CARE. Otherwise, *T. megapotamicum* is out of range in south-central Utah. Fendlerbush (*Fendlera rupicola*) and creeping rush-pea (*Caesalpinia repens*) are both included in the book, though the text correctly notes that they have not been documented from the park itself. A careless reader could be confused into thinking they are members of the park flora.



**Table 3-14. New vascular plant taxa confirmed or reported for Capitol Reef National Park, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Boraginaceae	<i>Cryptantha johnstonii</i>	Johnston's cryptanth	PerF	LocEn	Rep	Unk	Clark (2009) includes a photo and reports species from N end of park. All previous herbarium specimens observed at CARE have been misidentified (previously falsely reported). Confirmation needed (photo from Clark 2009 not definitive).
Cactaceae	<i>Opuntia erinacea</i> ( <i>O. polyacantha</i> var. <i>erinacea</i> )	common prickly pear	PerF	Wide	Rep	Unk	Clark and others (2009). Variety not indicated. Previously on potential list.
Caryophyllaceae	<i>Arenaria hookeri</i> var. <i>desertorum</i> ( <i>Eremogone hookeri</i> )	Hooker's sandwort	PerF	RegEn	Pres	Unk	Clark (2009) photo from N end of park. Previously on potential list.
Chenopodiaceae	<i>Atriplex rosea</i>	tumbling orach	AnnF	Intro	Rep	Unk	Clark and others (2009). Previously cited as falsely reported based on misidentified specimens in CARE herbarium. Native to Eurasia.
Compositae (Asteraceae)	<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	PerF	Wide	Rep	Unk	Clark and others (2009).
Compositae (Asteraceae)	<i>Prenanthes exigua</i> ( <i>Lygodesmia exigua</i> )	prenanthes	AnnF	Wide	Pres	Rare	Topp s.n. CARE (2010). Previously on potential list.
Cyperaceae	<i>Scirpus validus</i> ( <i>Schoenoplectus tabernaemontani</i> , <i>Sch. lacustris</i> ssp. <i>validus</i> )	soft-stem bulrush	PerG	Wide	Rep	Unk	Clark and others (2009). Previously cited as falsely reported based on misidentified specimens in CARE herbarium.
Fagaceae	<i>Quercus x eastwoodiae</i>	Eastwood's oak	Shrub	RegEn	Rep	Unk	Clark and others (2009) as <i>Q. havardii</i> x <i>gambellii</i> . Previously cited as falsely reported.
Gramineae (Poaceae)	<i>Festuca ovina</i> var. <i>ingrata</i> ( <i>F. idahoensis</i> )	Idaho fescue	PerG	Wide	Rep	Unk	Clark and others (2009).
*Gramineae (Poaceae)	<i>Festuca pratensis</i> ( <i>Lolium pratense</i> , <i>Schedonorus pratensis</i> )	meadow fescue	PerG	Intro	Pres	Unc	Weissinger 06290901 CARE (2009). Previously on falsely reported list. Native to Eurasia.
Gramineae (Poaceae)	<i>Phalaris arundinacea</i> ( <i>Phalaroides arundinacea</i> )	reed canary grass	PerG	Wide	Pres	Unc	Ducette JD08071101 (2011).
Gramineae (Poaceae)	<i>Stipa nelsonii</i> ( <i>Achnatherum nelsonii</i> , <i>S. columbiana</i> var. <i>nelsonii</i> )	Nelson's needlegrass	PerG	Wide	Rep	Unk	Clark and others (2009). Previously cited as falsely reported based on misidentified specimens in CARE herbarium.

Table 3-14. New vascular plant taxa confirmed or reported for Capitol Reef National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Leguminosae (Fabaceae)	<i>Astragalus miser</i>	weedy milkvetch	PerF	Wide	Rep	Unk	Clark and others (2009). Variety not indicated, but most likely var. <i>oblongifolius</i> . Previously cited as falsely reported based on misidentified specimens in CARE herbarium.
Leguminosae (Fabaceae)	<i>Lathyrus lanszwertii</i>	Lanszwert's sweetpea	PerF	Wide	Rep	Unk	Clark and others (2009). Variety not indicated, but most likely var. <i>laetivirens</i> .
Liliaceae (Alliaceae)	<i>Allium acuminatum</i>	taper-tip onion	PerF	Wide	Rep	Unk	Clark and others (2009).
Oleaceae	<i>Forestiera pubescens</i> ( <i>F. neomexicana</i> )	desert olive	Shrub	Wide	Rep	Unk	Clark and others (2009). Previously on potential list.
*Onagraceae	<i>Camissonia bolanderi</i>	Bolander's camissonia	AnnF	LocEn	Pres	Rare	Heil 2743 CARE (1986). Newly described species, duplicate cited by Welsh and others (2008).
Pinaceae	<i>Abies concolor</i>	white fir	Tree	Wide	Rep	Unk	Clark and others (2009).
Polemoniaceae	<i>Linanthastrum nuttallii</i> ( <i>Leptosiphon nuttallii</i> , <i>Linanthus nuttallii</i> )	Nuttall's linanthus	PerF	Wide	Rep	Unk	Clark and others (2009). Previously cited as falsely reported based on misidentified specimens in CARE herbarium.
Polygonaceae	<i>Eriogonum salsuginosum</i> ( <i>Stenogonum salsuginosum</i> )	smooth wild buckwheat	AnnF	Wide	Pres	Com	Topp s.n. CARE (2010). Previously on potential list.
Rosaceae	<i>Potentilla diversifolia</i>	wedgeleaf cinquefoil	PerF	Wide	Rep	Unk	Clark and others (2009). Variety not indicated, but probably var. <i>diversifolia</i> . Previously cited as falsely reported based on misidentified specimens in CARE herbarium.
Violaceae	<i>Viola canadensis</i> ( <i>V. scopulorum</i> , <i>V. rydbergii</i> )	Canadian white violet	PerF	Wide	Rep	Unk	Clark and others (2009). Previously cited as falsely reported based on misidentified specimens in CARE herbarium.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-15. Changes in status for Capitol Reef National Park species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Papaveraceae	<i>Argemone munita</i> var. <i>rotundata</i>	armed prickly-poppy	Rep	Pres	Unk	Clark (2009) photo, found in S end of park.

**Table 3-16. Revised statistical summary of the flora of Capitol Reef National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	842	67	909
Full species (excluding varieties and subspecies)	793	59	852
Families	90	1	91
<b>Life Form Diversity</b>			
Tree taxa	49	3	52
Shrub taxa	115	10	125
Perennial forb taxa	398	39	437
Annual forb taxa	138	5	143
Perennial graminoid taxa	110	9	119
Annual graminoid taxa	22	1	23
Fern taxa	10	0	10
<b>Biogeographic Diversity</b>			
Introduced taxa	120	4	124
<b>Native taxa</b>			
Locally endemic taxa	27	2	29
Regionally endemic taxa	111	6	117
Disjunct taxa	1	0	1
Peripheral taxa	8	0	8
Sparse taxa	14	1	15
Widespread taxa	561	54	615
<i>Total native taxa</i>	<i>722</i>	<i>63</i>	<i>785</i>

This table updates Table 3.1 from Fertig (2009a) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.6 Cedar Breaks National Monument

Since 2008, a rare plant survey (Fertig and Reynolds 2009), general floristic survey (Fertig 2009g), and vegetation mapping study (Tendick et al. 2011b) have documented 41 new plant species for Cedar Breaks National Monument (CEBR) (Table 3-17). One taxon, Zion jamesia (*Jamesia americana* var. *zionis*), was removed from the flora (Table 3-18) after it was found that monument specimens were misidentified (Fertig and Reynolds 2009). Overall, the flora of CEBR has increased by 40 species (11.6%), to a current total of 385 taxa (Table 3-19). At least 27 of the new species were previously identified as potential or falsely reported for the monument (Fertig 2009b).

Among the noteworthy additions to the flora of CEBR over the last four years are first reports of rosy cliff jamesia (*Jamesia americana* var. *rosea*) for Utah (Fertig and Reynolds 2009), and three new families: Ephedraceae, Loasaceae, and Ophioglossaceae (Figure 3-2). One new local endemic, Tushar penstemon (*Penstemon caespitosus* var. *suffruticosus*), is now known from the bottom of Ashdown Canyon within the monument. Two additional non-native species have also been documented from the canyon bottom:



Figure 3-2. Moonwort (*Botrychium lunaria*), newly documented for Cedar Breaks National Monument from the north rim of the Cedar Breaks Amphitheater in August 2009. This species is the first member of the Ophioglossaceae (moonwort) family to be found in CEBR. Only one individual was observed and so it was photographed rather than collected. Photo by W. Fertig from Fertig (2009g).

bull thistle (*Cirsium vulgare*) and prickly lettuce (*Lactuca serriola*). Neither is considered noxious by the State of Utah.

The adjacent Ashdown Gorge Wilderness Area of Dixie National Forest contains 308 vascular plant taxa (Fertig 2009g). In recent years, the Iron County Commission has discussed the potential of merging the wilderness area with CEBR to create a larger Cedar Breaks National Park. Though no action has been taken on this idea, the flora of CEBR would increase by 56 species if the two areas were merged (not counting 5 additional taxa from Ashdown Gorge recently reported for the monument by Tendick et al. 2011b) (Fertig 2009g).

Several additional species reported for CEBR by the vegetation mapping team (Tendick et al. 2011b) were not substantiated with voucher specimens and are here considered questionable. These are mainly species that are out of range, occur in habitats not found in CEBR, or are already represented in the flora by more plausible look-alikes. These taxa include:

- *Alnus incana* (Betulaceae): somewhat out of range; may be *Betula occidentalis*
- *Mertensia ciliata* (Boraginaceae): out of range; more likely to be *M. arizonica*, a very abundant look-alike species at CEBR
- *Erigeron canaanii* (Compositae): a Zion National Park and Navajo sandstone endemic that lacks suitable habitat in CEBR
- *Hieracium albiflorum* (Compositae): well out of range
- *Senecio crassulus* (Compositae): well out of range
- *Smilacina racemosa* (Liliaceae): out of range, more likely to be *S. stellata*
- *Rumex paucifolius* (Polygonaceae): out of range
- *Delphinium occidentale* (Ranunculaceae): all previous records based on *Aconitum columbianum*; more likely to be *D. barbeyi*
- *Ligusticum filicinum* (Umbelliferae): well out of range; probably *L. porteri*.

**Table 3-17. New vascular plant taxa confirmed or reported for Cedar Breaks National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Aceraceae	<i>Acer grandidentatum</i>	bigtooth maple	Tree	Wide	Pres	Unc	Fertig 25115 CEBR (2009). Previously on potential list.
Anacardiaceae	<i>Rhus aromatica</i> var. <i>trilobata</i> ( <i>R. trilobata</i> var. <i>trilobata</i> )	squawbush	Shrub	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
*Boraginaceae	<i>Lappula occidentalis</i> var. <i>occidentalis</i> ( <i>L. redowskii</i> var. <i>redowskii</i> )	western stickseed	AnnF	Wide	Pres	Rare	Fertig, Holmgren, & Holmgren 25071 CEBR (2009).
Boraginaceae	<i>Lithospermum incisum</i>	showy stoneseed	PerF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
*Caryophyllaceae	<i>Stellaria umbellata</i>	umbrella starwort	PerF	Wide	Pres	Unc	Topp ST08060901 CEBR (2009). Previously on potential list.
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>fremontii</i> ( <i>C. fremontii</i> )	Fremont's goosefoot	AnnF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
*Compositae (Asteraceae)	<i>Artemisia carruthii</i>	Carruth's wormwood	PerF	Wide	Pres	Rare	Fertig & Reynolds 24233 CEBR (2008). Previously on potential list.
Compositae (Asteraceae)	<i>Aster eatonii</i> ( <i>Symphotrichum eatonii</i> , <i>A. bracteolatus</i> )	Eaton's aster	PerF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
Compositae (Asteraceae)	<i>Chrysothamnus depressus</i>	dwarf rabbitbrush	Shrub	Wide	Rep	Unk	Tendick and others (2011b).
*Compositae (Asteraceae)	<i>Cirsium clavatum</i> var. <i>clavatum</i>	Fish Lake thistle	PerF	RegEn	Pres	Rare	Welsh & Neese 21349 BRY (1982). Previously on potential list.
*Compositae (Asteraceae)	<i>Cirsium vulgare</i>	bull thistle	PerF	Intro	Pres	Rare	Fertig 25129 CEBR (2009). Previously on potential list. Native to Europe.
*Compositae (Asteraceae)	<i>Erigeron divergens</i> var. <i>divergens</i>	spreading daisy	PerF	Wide	Pres	Unc	Fertig & Reynolds 24210 CEBR (2008). Previously on potential list.
*Compositae (Asteraceae)	<i>Lactuca serriola</i>	prickly lettuce	AnnF	Intro	Pres	Unc	Fertig 25130 CEBR (2009). Native to Europe.
*Compositae (Asteraceae)	<i>Machaeranthera canescens</i> var. <i>canescens</i> ( <i>Aster canescens</i> , <i>Dieteria canescens</i> var. <i>canescens</i> )	hoary aster	PerF	Wide	Pres	Unc	Fertig & Reynolds 24230 CEBR (2008). Previously on potential list.
Compositae (Asteraceae)	<i>Senecio dimorphophyllus</i> ( <i>Packera dimorphophylla</i> )	two-leaf groundsel	PerF	RegEn	Rep	Unk	Tendick and others (2011b). Variety not indicated, but probably var. <i>dimorphophyllus</i> Previously on potential list.



**Table 3-17. New vascular plant taxa confirmed or reported for Cedar Breaks National Monument, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Compositae (Asteraceae)	<i>Solidago nana</i>	baby goldenrod	PerF	Wide	Rep	Unk	Tendick and others (2011b). May be <i>S. velutina</i> .
*Compositae (Asteraceae)	<i>Tetradymia canescens</i>	spineless horsebrush	Shrub	Wide	Pres	Unc	Fertig & Reynolds 24231 CEBR (2008). Previously on potential list.
*Crassulaceae	<i>Sedum rhodanthum</i> ( <i>Rhodiola rhodantha</i> , <i>Clementsia rhodantha</i> )	redpod stoncrop	PerF	Wide	Pres	Rare	Fertig & Reynolds 24094 (2008). Previously on potential list.
*Cyperaceae	<i>Carex capillaris</i>	hair sedge	PerG	Wide	Pres	Rare	Fertig 25118 CEBR (2009). Previously on potential list.
Cyperaceae	<i>Carex praegracilis</i>	blackreeper sedge	PerG	Wide	Rep	Unk	Tendick and others (2011b).
Ephedraceae	<i>Ephedra viridis</i>	green ephedra	Shrub	Wide	Rep	Unk	Tendick and others (2011b). Variety not given, but probably var. <i>viridis</i> .
*Equisetaceae	<i>Equisetum hyemale</i> var. <i>affine</i> ( <i>E. praealtum</i> , <i>Hippochaete hyemalis</i> ssp. <i>affinis</i> )	tall scouring-rush	Fern	Wide	Pres	Unc	Fertig & Reynolds 24212 CEBR (2008).
Gramineae (Poaceae)	<i>Muhlenbergia montana</i>	mountain muhly	PerG	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
Gramineae (Poaceae)	<i>Poa leptocoma</i>	bog bluegrass	PerG	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
*Liliaceae (Calochortaceae)	<i>Disporum trachycarpum</i> ( <i>Prosartes trachycarpa</i> )	rough-fruit fairy-bells	PerF	Wide	Pres	Unc	Fertig 25116 CEBR (2009). Previously on potential list.
Loasaceae	<i>Mentzelia multiflora</i> ( <i>Nuttallia multiflora</i> )	desert stickleaf	PerF	Wide	Rep	Unk	Tendick and others (2011b).
*Onagraceae	<i>Epilobium brachycarpum</i> ( <i>E. paniculatum</i> )	autumn willow-herb	AnnF	Wide	Pres	Unc	Fertig 25131 CEBR (2009). Previously on potential list.
*Onagraceae	<i>Epilobium ciliatum</i> ( <i>E. ciliatum</i> var. <i>ciliatum</i> , <i>E. watsonii</i> , <i>E. adencaulon</i> )	northern willow-herb	PerF	Wide	Pres	Unc	Fertig & Reynolds 24216 CEBR (2008). Previously on falsely reported list.
*Ophioglossaceae	<i>Botrychium lunaria</i>	moonwort	Fern	Sparse	Pres	Rare	Fertig photo (2009).
*Orchidaceae	<i>Epipactis gigantea</i>	giant helleborine	PerF	Wide	Pres	Rare	Fertig 24768 CEBR (2009).
Polygonaceae	<i>Eriogonum umbellatum</i> var. <i>subaridum</i>	arid wild buckwheat	PerF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list. Could be var. <i>porteri</i> .
*Ranunculaceae	<i>Actaea rubra</i> ( <i>A. rubra</i> ssp. <i>arguta</i> )	red baneberry	PerF	Wide	Pres	Unc	Fertig 25117 CEBR (2009).
Rhamnaceae	<i>Ceanothus fendleri</i>	Fendler's mountain-lilac	Shrub	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.

**Table 3-17. New vascular plant taxa confirmed or reported for Cedar Breaks National Monument, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Rosaceae	<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	Shrub	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
Rosaceae	<i>Potentilla concinna</i>	pretty cinquefoil	PerF	Wide	Rep	Unk	Tendick and others (2011b). Variety not indicated. Previously on potential list (as var. <i>proxima</i> ).
Rosaceae	<i>Potentilla glandulosa</i> ( <i>Drymocallis glandulosa</i> )	sticky cinquefoil	PerF	Wide	Rep	Unk	Tendick and others (2011b). Variety not indicated.
Rosaceae	<i>Purshia mexicana</i> var. <i>stansburyana</i> ( <i>P. stansburiana</i> , <i>Cowania mexicana</i> )	cliffrose	Shrub	Wide	Rep	Unk	Tendick and others (2011b).
Saxifragaceae	<i>Heuchera rubescens</i> var. <i>versicolor</i> ( <i>H. versicolor</i> )	hairy alumroot	PerF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.
*Saxifragaceae (Hydrangeaceae)	<i>Jamesia americana</i> var. <i>rosea</i>	rosy cliff jamesia	Shrub	Disj	Pres	Rare	Fertig & Reynolds 24147 CEBR (2008). Previously cited as <i>J. americana</i> var. <i>zionis</i> .
*Scrophulariaceae	<i>Penstemon caespitosus</i> var. <i>suffruticosus</i> ( <i>P. tusharensis</i> )	Tushar penstemon	PerF	LocEn	Pres	Rare	Fertig & Reynolds 24209 CEBR (2008). Previously on potential list.
Scrophulariaceae	<i>Penstemon procerus</i> var. <i>aberrans</i>	small-flower penstemon	PerF	Wide	Rep	Unk	Tendick and others (2011b). Previously on potential list.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-18. Changes in status for Cedar Breaks National Monument species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
*Liliaceae (Alliaceae)	<i>Allium bisceptrum</i>	twincest onion	Hist	Pres	Unc	Photographed by Bill Gray (2009) by CEBR picnic grounds.
*Saxifragaceae (Hydrangeaceae)	<i>Jamesia americana</i> var. <i>zionis</i>	Zion jamesia	Pres	FalsRep	NA	Previous reports based on misidentified specimens of <i>J. americana</i> var. <i>rosea</i> .

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-19. Revised statistical summary of the flora of Cedar Breaks National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	358	27	385
Full species (excluding varieties and subspecies)	346	24	370
# of Families	56	2	58
<b>Life Form Diversity</b>			
Tree taxa	15	1	16
Shrub taxa	36	7	43
Perennial forb taxa	208	13	221
Annual forb taxa	16	2	18
Perennial graminoid taxa	72	4	76
Annual graminoid taxa	3	0	3
Fern taxa	8	0	8
<b>Biogeographic Diversity</b>			
Introduced taxa	19	1	20
<b>Native taxa</b>			
Locally endemic taxa	17	0	17
Regionally endemic taxa	20	1	21
Disjunct taxa	2	0	2
Peripheral taxa	0	0	0
Sparse taxa	7	0	7
Widespread taxa	293	25	318
<i>Total native taxa</i>	<i>339</i>	<i>26</i>	<i>365</i>

This table updates Table 3.1 from Fertig (2009b), Table 5 from Fertig and others (2009c), and Table 3 from Fertig and others (2010) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).



### 3.7 Colorado National Monument

The flora of Colorado National Monument (COLM) has not changed substantially since the annotated checklist of Hogan and others (2009a) was published. That report already incorporated new species observations by the NCPN vegetation mapping team (Von Loh et al. 2007). Some corrections to the checklist are provided in Fertig and others (2010).

In 2011, Katrina Lund documented two new species for the monument (Tables 3-20, 3-21). Compressed rush (*Juncus compressus*) was previously on the potential list, but has now been documented with a voucher specimen. White poplar (*Populus alba*) was formerly on the reported list, but is also now confirmed. These additions raise the number of species documented for COLM to 468 (Table 3-22).

**Table 3-20. New vascular plant taxa confirmed or reported for Colorado National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Juncaceae	<i>Juncus compressus</i>	compressed rush	PerG	Intro	Pres	Unk	Lund COLMUTE012011 (2011). Previously on potential list. Native to Europe.

**Table 3-21. Changes in status for Colorado National Monument species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Salicaceae	<i>Populus alba</i>	white poplar	Rep	Pres	Unk	Lund KL06221101 (2011).

**Table 3-22. Revised statistical summary of the flora of Colorado National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	416	52	468
Full species (excluding varieties and subspecies)	408	51	459
# of Families	77	3	80
<b>Life Form Diversity</b>			
Tree taxa	19	2	21
Shrub taxa	63	8	71
Perennial forb taxa	182	26	208
Annual forb taxa	70	8	78
Perennial graminoid taxa	58	6	64
Annual graminoid taxa	14	2	16
Fern taxa	10	0	10
<b>Biogeographic Diversity</b>			
Introduced taxa	58	9	67
<b>Native taxa</b>			
Locally endemic taxa	3	0	3
Regionally endemic taxa	41	2	43
Disjunct taxa	0	0	0
Peripheral taxa	17	2	19
Sparse taxa	4	0	4
Widespread taxa	293	39	332
<i>Total native taxa</i>	358	43	401

This table updates Table 3.1 from Hogan and others (2009a) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Weber and Wittman (2001).

### 3.8 Curecanti National Recreation Area

Since 2008, the NCPN vegetation mapping team (Tendick et al. 2010) has confirmed or reported 25 additional species for Curecanti National Recreation Area (CURE) (Table 3-23). Three other species that were previously reported have since been documented with a voucher (Table 3-24). These additions have increased the total number of confirmed and reported plant species from CURE to 704 taxa (Table 3-25). This number represents an increase of 3.7% in the total documented flora. At least seven of the new taxa were previously listed as potentially occurring in the recreation area (Hogan et al. 2009c).

Two errors have come to light since the original CURE checklist was published. The name *Lomatium triternatum* var. *platycarpum* (Apiaceae) should be changed to ssp. *platycarpum* to conform with the nomenclature of Weber and Wittman (2001). *Hippuris vulgaris* (Hippuridaceae) was incorrectly included in both Appendix A (confirmed species list) and Appendix B (potential species). This plant has been documented from the park, and so should be dropped from the potential list.

Tendick and others (2010) report several additional species for CURE which we consider questionable. These species (listed below) are not known from south-central Colorado, occur in habitats not found in the recreation area, or have probably been mistaken for more common species:

- *Yucca angustissima* (Agavaceae): not known from Colorado; report probably based on *Y. harrimaniae*
- *Cymopterus multinervatus* (Apiaceae): reports probably based on *C. constancei*
- *Asclepias involucreta* (Asclepiadaceae): outside expected range
- *Agoseris heterophylla* (Asteraceae): well outside expected range
- *Artemisia michauxiana* (Asteraceae): suitable habitat not present
- *Cirsium clavatum* var. *osterhoutii* (*C. araneans*) (Asteraceae): this Colorado endemic is listed as Historical by the Colorado Natural Heritage Program; report probably based on *C. centaureae*, or miscoded *Cirsium arvense* (*Breea arvensis*)
- *Grindelia arizonica* (Asteraceae): outside of expected range; may be *G. squarrosa*
- *Heterotheca subaxillaris* (Asteraceae): outside of expected range
- *Packera tridenticulata* (*Senecio tridenticulatus*) (Asteraceae): more likely to be *Packera neomexicana*
- *Solidago nana* (Asteraceae) outside expected range
- *Solidago nemoralis* (Asteraceae): more likely to be *S. velutina*
- *Stenotus acaulis* (Asteraceae): more likely to be *S. armerioides*
- *Tetradymia nuttallii* (Asteraceae): well outside expected range
- *Townsendia strigosa* (Asteraceae): more likely to be *T. incana*
- *Oreocarya sericea* (*Cryptantha sericea*) (Boraginaceae): outside expected range
- *Schoenocrambe linearifolia* (Brassicaceae): report probably based on *S. linifolia*
- *Carex bebbii* (Cyperaceae): suitable habitat not present
- *Carex egglestonii* (Cyperaceae): suitable habitat not present
- *Thermopsis rhombifolia* (Fabaceae): more likely to be *T. montana*
- *Ribes coloradoense* (*R. laxiflorum*) (Grossulariaceae): previous reports based on *R. wolfii*
- *Juncus parryi* (Juncaceae): suitable habitat not present
- *Achnatherum robustum* (*Stipa robusta*) (Poaceae): outside expected range
- *Phlox condensata* (Polemoniaceae): suitable habitat not present
- *Phlox pulvinata* (Polemoniaceae): suitable habitat not present
- *Eriogonum umbellatum* var. *subaridum* (Polygonaceae): well outside expected range
- *Polygonum minimum* (Polygonaceae): outside expected range
- *Rumex salicifolius* var. *transitorius* (Polygonaceae): not known from Colorado;

- probably *R. triangulivalvis*
- *Oreobatus deliciosus* (*Rubus deliciosus*) (Rosaceae): outside of expected range
  - *Potentilla diversifolia* (Rosaceae): suitable habitat not present
  - *Salix lutea* (Salicaceae): outside expected range
  - *Castilleja rhexifolia* (Scrophulariaceae): suitable habitat not present
  - *Veronica scutellata* (Scrophulariaceae): outside expected range.

**Table 3-23. New vascular plant taxa confirmed or reported for Curecanti National Recreation Area, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Alsiniaceae (Caryophyllaceae)	<i>Cerastium strictum</i> ( <i>C. arvense</i> , <i>S. strictum</i> )	field chickweed	PerF	Wide	Rep	Unk	Tendick and others (2010). Previously on potential list.
Asteraceae (Compositae)	<i>Brickellia microphylla</i> var. <i>scabra</i>	rough brickellbush	Shrub	Wide	Rep	Unk	Tendick and others (2010). Variety not given, but <i>scabra</i> is the only var. in CO.
Asteraceae (Compositae)	<i>Cirsium calcareum</i> (Included in <i>C. arizonicum</i> var. <i>bipinnatum</i> by some authors)	Caineville thistle	PerF	RegEn	Rep	Unk	Tendick and others (2010). Previously on potential list.
Asteraceae (Compositae)	<i>Cirsium eatonii</i> ( <i>C. tweedyi</i> , <i>C. polyphyllum</i> )	Eaton's thistle	PerF	RegEn	Rep	Unk	Tendick and others (2010). Previously on potential list.
Asteraceae (Compositae)	<i>Cirsium perplexans</i>	Rocky Mountain thistle	PerF	RegEn	Rep	Unk	Tendick and others (2010). Accepted here with hesitation—confirmation needed.
Athyriaceae (Aspleniaceae, Polypodiaceae)	<i>Athyrium filix-femina</i>	lady fern	Fern	Wide	Rep	Unk	Tendick and others (2010).
Brassicaceae (Cruciferae)	<i>Descurainia californica</i>	California tansy-mustard	AnnF	Wide	Rep	Unk	Tendick and others (2010). Previously on potential list.
Brassicaceae (Cruciferae)	<i>Descurainia pinnata</i> ssp. <i>nelsonii</i>	western tansy-mustard	AnnF	Wide	Rep	Unk	Tendick and others (2010).
Caprifoliaceae (Linnaeaceae)	<i>Linnaea borealis</i>	twinflower	Shrub	Wide	Rep	Unk	Tendick and others (2010).
Chenopodiaceae (Sarcobataceae)	<i>Sarcobatus vermiculatus</i>	greasewood	Shrub	Wide	Rep	Unk	Tendick and others (2010). Previously on potential list.
Cyperaceae	<i>Carex athrostachya</i>	slender-beaked sedge	PerG	Wide	Rep	Unk	Tendick and others (2010).
Cyperaceae	<i>Carex geophila</i>	White Mountain sedge	PerG	Wide	Rep	Unk	Tendick and others (2010). Previously on potential list.
Fabaceae (Leguminosae)	<i>Lupinus polyphyllus</i> var. <i>prunophilus</i> ( <i>L. prunophilus</i> )	meadow lupine	PerF	Wide	Rep	Unk	Tendick and others (2010). Previously on potential list.
Geraniaceae	<i>Geranium viscosissimum</i>	sticky crane's-bill	PerF	Wide	Rep	Unk	Tendick and others (2010).
Helleboraceae (Ranunculaceae)	<i>Delphinium glaucum</i> (Includes <i>D. glaucescens</i> )	Tower larkspur	PerF	Wide	Pres	Unc	Topp ST02241001 CURE (2010).
*Melanthiaceae (Liliaceae)	<i>Veratrum tenuipetalum</i>	false hellebore	PerF	Wide	Pres	Unk	Topp ST08221001 CURE (2010).
Orchidaceae	<i>Corallorhiza maculata</i>	spotted coral-root	PerF	Wide	Rep	Unk	Tendick and others (2010).

**Table 3-23. New vascular plant taxa confirmed or reported for Curecanti National Recreation Area, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Pinaceae	<i>Abies concolor</i>	white fir	Tree	Wide	Rep	Unk	Tendick and others (2010).
Poaceae (Gramineae)	<i>Agrostis stolonifera</i> ( <i>A. alba</i> )	redtop	PerG	Intro	Rep	Unk	Tendick and others (2010). Native to Eurasia.
Poaceae (Gramineae)	<i>Bromus secalinus</i>	rye chess	AnnG	Intro	Rep	Unk	Tendick and others (2010). Native to Eurasia.
Poaceae (Gramineae)	<i>Elymus bakeri</i> ( <i>Agropyron bakeri</i> )	Baker's wheatgrass	PerG	RegEn	Rep	Unk	Tendick and others (2010). Confirmation needed.
Poaceae (Gramineae)	<i>Psathyrostachys juncea</i> ( <i>Elymus junceus</i> )	Russian wildrye	PerG	Intro	Rep	Unk	Tendick and others (2010). Native to Russia.
Polygonaceae	<i>Eriogonum microthecum</i> var. <i>simpsonii</i> ( <i>E. microthecum</i> var. <i>foliosum</i> )	slender wild buckwheat	Shrub	Wide	Rep	Unk	Tendick and others (2010).
Scrophulariaceae	<i>Veronica anagallis-aquatica</i>	water speedwell	PerF	Intro	Rep	Unk	Tendick and others (2010). Native to Europe.
Valerianaceae	<i>Valeriana occidentalis</i>	western valerian	PerF	Wide	Pres	Unc	Topp ST08221002 CURE (2010).

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-24. Changes in status for Curecanti National Recreation Area species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year).
*Boraginaceae	<i>Oreocarya suffruticosa</i> ( <i>Cryptantha jamesii</i> )	James' cryptanth	Rep	Pres	Rare	Topp s.n. CURE (2008).
Poaceae (Gramineae)	<i>Achnatherum nelsonii</i>	Nelson's needlegrass	Rep	Pres	Unc	Topp ST08221003 CURE (2010).
Scrophulariaceae	<i>Pedicularis procera</i>	Gray's lousewort	Rep	Pres	Unc	Topp ST08221004 CURE (2010).

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-25. Revised statistical summary of the flora of Curecanti National Recreation Area.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	533	171	704
Full species (excluding varieties and subspecies)	529	167	696
Families	89	6	95
<b>Life Form Diversity</b>			
Tree taxa	15	3	18
Shrub taxa	62	14	76
Perennial forb taxa	305	82	387
Annual forb taxa	62	27	89
Perennial graminoid taxa	75	37	112
Annual graminoid taxa	5	6	11
Fern taxa	9	2	11
<b>Biogeographic Diversity</b>			
Introduced taxa	72	21	93
<b>Native taxa</b>			
Locally endemic taxa	8	2	10
Regionally endemic taxa	23	9	32
Disjunct taxa	1	0	1
Peripheral taxa	3	4	7
Sparse taxa	4	1	5
Widespread taxa	422	134	556
<i>Total native taxa</i>	<i>461</i>	<i>150</i>	<i>611</i>

This table updates Table 3.1 from Hogan and others (2009c) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Weber and Wittman (2001).

### 3.9 Dinosaur National Monument

The NCPN vegetation mapping team has documented 55 new plant species for Dinosaur National Monument (DINO) (Coles et al. 2008a). Two additional species have been added for the monument flora since 1998 based on taxonomic revisions by Welsh and others (2008), and one taxon has been removed from the species list based on a misidentification (Tables 3-26, 3-27). As a result of these changes, the flora of DINO has shown a net increase of 56 plant species (6.5%) and now totals 812 confirmed and reported taxa (Table 3-28). Thirty-three of the new species were previously considered potential or falsely reported for the monument (Fertig 2009c).

The number of non-native species reported for DINO has increased by nine taxa due to the field work of Coles and others (2008a). Five of these new species are introduced forage or reclamations species: intermediate wheatgrass (*Elymus hispidus*), Russian wild-rye (*Elymus junceus*), chickpea milkvetch (*Astragalus cicer*), alsike clover (*Trifolium hybridum*), and red clover (*T. pratense*). One new exotic species, stork's bill (*Erodium cicutarium*), is listed as noxious by the State of Colorado.

Poison ivy (*Toxicodendron rydbergii*) was listed by Fertig (2009c) as historical in the monument, because it had not been relocated since before 1970. Coles and others (2008a) report this species for the monument, suggesting it is still extant. The plant's status has not been updated until its status can be confirmed with a voucher, photo, or more specific locality information.

Several additional species cited by Coles and others (2008a) are not included here. These species are excluded because DINO is outside of their known range, suitable habitat is lacking, or the identification is questionable. These species include:

- *Antennaria rosulata* (Compositae): well outside expected range; probably *A. dimorpha*
- *Artemisia spiciformis* (Compositae): outside expected range, habitat probably not present

- *Brickellia longifolia* (Compositae): outside expected range
- *Chrysothamnus nauseosus* var. *junceus* (Compositae): well outside expected range
- *Helianthus anomalus* (Compositae): well outside expected range; probably *H. petiolaris* ssp. *fallax*
- *Hymenoxys acaulis* var. *ivesiana* (Compositae): outside expected range
- *Solidago simplex* (*S. spathulata*) (Compositae): previous reports based on *S. nana*
- *Townsendia annua* (Compositae): outside expected range; report probably based on *T. incana*
- *Sedum debile* (Crassulaceae): outside expected range; report probably based on *S. lanceolatum*
- *Physaria newberryi* (Cruciferae): outside expected range; report may be based on *P. acutifolia*
- *Physaria reediana* (Cruciferae): previous reports based on *P. subumbellata*, true *P. reediana* is not known from Utah
- *Carex crawei* (Cyperaceae): outside expected range
- *Shepherdia rotundifolia* (Elaeagnaceae): outside expected range
- *Chamaesyce parryi* (Euphorbiaceae): well outside expected range; probably *C. glyptosperma* or *C. serpyllifolia*
- *Erioneuron pulchellum* (Gramineae): outside expected range
- *Poa leptocoma* (Gramineae): previous reports based on *Poa nervosa* × *P. pratensis* hybrids, confirmation needed
- *Stipa nelsonii* ssp. *dorei* (Gramineae): more likely to be var. *nelsonii*, confirmation needed
- *Juncus orthophyllus* (Juncaceae): Pacific Northwest species not known from Utah or Colorado
- *Habenaria hyperborea* (Orchidaceae): previous reports based on *H. zothecina*
- *Gilia scopulorum* (Polemoniaceae): Mohave species, outside expected range
- *Phlox pulvinata* (Polemoniaceae): suitable habitat probably not present



- *Eriogonum umbellatum* var. *subaridum* (Polygonaceae): outside expected range; more likely to be var. *aureum*
- *Physocarpus malvaceus* (Rosaceae): reports probably based on *P. alternans*
- *Purshia mexicana* var. *stansburyana* (Rosaceae): outside expected range, confirmation needed
- *Orthocarpus tolmiei* (Scrophulariaceae): outside expected range, more likely to be *O. luteus*
- *Penstemon paysoniorum* (Scrophulariaceae): Wyoming endemic, out of range.

**Table 3-26. New vascular plant taxa confirmed or reported for Dinosaur National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Asclepiadaceae	<i>Asclepias subverticillata</i> (A. galioides)	whorled milkweed	PerF	Wide	Rep	Unk	Coles and others (2008a).
Cactaceae	<i>Coryphantha vivipara</i> ( <i>Escobaria vivipara</i> )	pincushion cactus	PerF	Wide	Rep	Unk	Coles and others (2008a). Variety not determined but most likely var. <i>vivipara</i> . Previously on potential list.
Cactaceae	<i>Sclerocactus whipplei</i> var. <i>roseus</i> ( <i>S. parviflorus</i> , <i>S. whipplei</i> var. <i>intermedius</i> )	small-flower fishhook cactus	PerF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Caprifoliaceae (Adoxaceae)	<i>Sambucus racemosa</i>	red elderberry	Shrub	Wide	Rep	Unk	Coles and others (2008a). Variety not determined but most likely var. <i>microbotrys</i> .
Caryophyllaceae	<i>Silene antirrhina</i>	sleepy catchfly	AnnF	Wide	Rep	Unk	Coles and others (2008a).
Caryophyllaceae	<i>Silene menziesii</i> ( <i>Anotities menziesii</i> )	Menzies' campion	PerF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Chenopodiaceae	<i>Chenopodium desiccatum</i> (C. <i>pratericola</i> )	desert goosefoot	AnnF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Chenopodiaceae	<i>Salicornia europaea</i> ( <i>S. europaea</i> ssp. <i>rubra</i> , <i>S. rubra</i> )	red saltwort	AnnF	Wide	Pres	Unc	Kast SK08221001 DINO (2010). Previously on potential list.
Compositae (Asteraceae)	<i>Artemisia ludoviciana</i> var. <i>latiloba</i> (A. <i>ludoviciana</i> ssp. <i>candicans</i> )	Louisiana wormwood	PerF	Sparse	Rep	Unk	Coles and others (2008a).
*Compositae (Asteraceae)	<i>Bidens cernua</i>	nodding bur-marigold	PerF	Wide	Pres	Unc	Topp ST01818090906 DINO (2009). Previously on potential list. From Colorado part of DINO.
Compositae (Asteraceae)	<i>Chrysothamnus greenei</i>	Greene's rabbitbrush	Shrub	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>lanceolatus</i>	lanceleaf rabbitbrush	Shrub	Wide	Rep	Unk	Coles and others (2008a). Previous reports were all misidentified.
Compositae (Asteraceae)	<i>Cirsium calcareum</i> (Included in <i>C. arizonicum</i> var. <i>bipinnatum</i> by some authors)	pretty thistle	PerF	Wide	Rep	Unk	Coles and others (2008a). Previous reports were all misidentified— confirmation needed.

Table 3-26. New vascular plant taxa confirmed or reported for Dinosaur National Monument, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Compositae (Asteraceae)	<i>Hieracium albiflorum</i> ( <i>Chlorocrepis albiflora</i> )	white hawkweed	PerF	Wide	Rep	Unk	Coles and others (2008a).
Compositae (Asteraceae)	<i>Iva xanthifolia</i> ( <i>Cyclachaena xanthifolia</i> )	marsh-elder	AnnF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Compositae (Asteraceae)	<i>Oxytenia acerosa</i> ( <i>Iva acerosa</i> )	copperweed	Shrub	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Compositae (Asteraceae)	<i>Solidago gigantea</i>	late goldenrod	PerF	Wide	Pres	Unc	Kast SK08211001 DINO (2010). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Sonchus asper</i>	spiny-leaf sow-thistle	AnnF	Intro	Rep	Unk	Coles and others (2008a). Native to Europe. Previously on potential list.
Cruciferae (Brassicaceae)	<i>Alyssum alyssoides</i>	pale madwort	AnnF	Intro	Rep	Unk	Coles and others (2008a). Native to Europe.
Cruciferae (Brassicaceae)	<i>Alyssum minus</i> ( <i>A. minus</i> var. <i>micranthum</i> , <i>A. simplex</i> )	European madwort	AnnF	Intro	Rep	Unk	Coles and others (2008a). Native to Eurasia.
Cruciferae (Brassicaceae)	<i>Draba cuneifolia</i>	wedgeleaf draba	AnnF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Cruciferae (Brassicaceae)	<i>Lepidium virginicum</i>	poor-man's pepperwort	AnnF	Wide	Rep	Unk	Coles and others (2008a). Variety not determined but most likely var. <i>pubescens</i> . Previously on potential list.
Cruciferae (Brassicaceae)	<i>Physaria utahensis</i> ( <i>Lesquerella utahensis</i> )	Utah bladderpod	PerF	RegEn	Rep	Unk	Coles and others (2008a). Previously on potential list.
*Cruciferae (Brassicaceae)	<i>Rorippa tenerrima</i>	low yellowcress	AnnF	Wide	Pres	Unc	Topp ST01180908 DINO (2009). Previously on potential list. From Colorado part of DINO.
Elaeagnaceae	<i>Shepherdia canadensis</i> ( <i>Lepargyrea canadensis</i> )	Canada buffalo-berry	Shrub	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Geraniaceae	<i>Erodium cicutarium</i>	stork's bill	AnnF	Intro	Rep	Unk	Coles and others (2008a). Previously on potential list. Native to Europe. CO state noxious weed.
Gramineae (Poaceae)	<i>Bromus ciliatus</i> ( <i>Bromopsis canadensis</i> )	fringed brome	PerG	Wide	Rep	Unk	Coles and others (2008a). Previously on falsely reported list.
Gramineae (Poaceae)	<i>Bromus hordeaceus</i> ( <i>B. mollis</i> , <i>B. racemosus</i> )	soft chess	AnnG	Intro	Rep	Unk	Coles and others (2008a). Native to Eurasia.
Gramineae (Poaceae)	<i>Cenchrus longispinus</i> ( <i>C. pauciflorus</i> )	field sandburr	AnnG	Wide	Rep	Unk	Coles and others (2008a).
*Gramineae (Poaceae)	<i>Crypsis alopecuroides</i>	pricklegrass	AnnG	Intro	Pres	Unc	Topp ST01180903 DINO (2009). Native to Eurasia. From Colorado part of DINO.

Table 3-26. New vascular plant taxa confirmed or reported for Dinosaur National Monument, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Gramineae (Poaceae)	<i>Elymus hispidus</i> ( <i>Agropyron intermedium</i> , <i>Elytrigia intermeida</i> , <i>Thinopyrum intermedium</i> )	intermediate wheatgrass	PerG	Intro	Rep	Unk	Coles and others (2008a). Previously on potential list. Native to Eurasia.
Gramineae (Poaceae)	<i>Elymus junceus</i> ( <i>Psathyrostachys juncea</i> )	Russian wildrye	PerG	Intro	Rep	Unk	Coles and others (2008a). Previously on potential list. Native to Russia.
Gramineae (Poaceae)	<i>Hordeum pusillum</i> ( <i>Critasion pulchellum</i> )	little barley	AnnG	Wide	Rep	Unk	Coles and others (2008a). Previously on falsely reported list.
Gramineae (Poaceae)	<i>Phalaris arundinacea</i> ( <i>Phalaroides arundinacea</i> )	reed canary grass	PerG	Wide	Pres	Unk	Weissinger RW08200901 DINO (2009). Previously on potential list.
Gramineae (Poaceae)	<i>Poa palustris</i>	fowl bluegrass	PerG	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Leguminosae (Fabaceae)	<i>Astragalus cicer</i>	chickpea milkvetch	PerF	Intro	Rep		Coles and others (2008a). Previously on potential list. Native to Europe.
Leguminosae (Fabaceae)	<i>Lupinus sericeus</i>	silky lupine	PerF	Wide	Rep		Coles and others (2008a). Variety not determined, but probably var. <i>sericeus</i> . Previously on potential list.
*Leguminosae (Fabaceae)	<i>Trifolium hybridum</i>	alsike clover	PerF	Intro	Pres		Topp ST08180901 DINO (2009). From Colorado part of DINO.
Leguminosae (Fabaceae)	<i>Trifolium pratense</i>	red clover	PerF	Intro	Rep		Coles and others (2008a). Previously on potential list. Native to Europe.
*Liliaceae (Calochortaceae)	<i>Calochortus ciscoensis</i> (Formerly included in <i>C. nuttallii</i> )	Cisco sego-lily	PerF	RegEn	Pres (Hist?)		Welsh 291 DINO (1955). Species newly described in 2008.
Liliaceae (Calochortaceae)	<i>Calochortus gunnisonii</i>	Gunnison's mariposa	PerF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Onagraceae (Calochortaceae)	<i>Epilobium angustifolium</i> var. <i>canescens</i> ( <i>Chamerion angustifolium</i> , <i>C. danielsii</i> )	fireweed	PerF	Wide	Rep	Unk	Coles and others (2008a).
Pinaceae	<i>Pinus flexilis</i>	limber pine	Tree	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Polemoniaceae	<i>Gilia leptomeria</i> ( <i>Aliciella leptomeria</i> )	common gilia	AnnF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.

**Table 3-26. New vascular plant taxa confirmed or reported for Dinosaur National Monument, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Polygonaceae	<i>Eriogonum alatum</i> ( <i>Pterogonum alatum</i> )	winged wild buckwheat	PerF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
Ranunculaceae	<i>Clematis columbiana</i> ( <i>C. pseudoalpina</i> , <i>Atragene columbiana</i> )	Columbian virgin's-bower	PerF	Wide	Rep	Unk	Coles and others (2008a). Could be based on <i>C. occidentalis</i> .
Ranunculaceae (Helleboraceae)	<i>Delphinium occidentale</i> ( <i>D. glaucum</i> , <i>D. glaucum</i> x <i>D. barnebyi</i> )	western larkspur	PerF	Wide	Rep	Unk	Coles and others (2008a). Previously on potential list.
*Rosaceae	<i>Potentilla gracilis</i> var. <i>hippianooides</i>	beautiful cinquefoil	PerF	RegEn	Hist	Rare	Welsh 474 BRY (1956). Species newly described in 2008, holotype from Dinosaur NM.
*Rosaceae	<i>Potentilla norvegica</i>	Norwegian cinquefoil	AnnF	Intro	Pres	Unc	Topp ST01180905 DINO (2009). Native to Europe & possibly E North America. Previously on falsely reported list.
Salicaceae	<i>Salix bebbiana</i>	Bebb's willow	Shrub	Wide	Rep	Unk	Coles and others (2008a). Previous reports have all been misidentified.
Saxifragaceae (Grossulariaceae)	<i>Ribes inerme</i>	whitestem gooseberry	Shrub	Wide	Rep	Unk	Coles and others (2008a).
Saxifragaceae (Grossulariaceae)	<i>Ribes lacustre</i>	spiny swamp currant	Shrub	Wide	Rep	Unk	Coles and others (2008a).
Saxifragaceae (Grossulariaceae)	<i>Ribes viscosissimum</i>	sticky currant	Shrub	Wide	Rep	Unk	Coles and others (2008a).
Scrophulariaceae	<i>Castilleja applegatei</i> var. <i>viscida</i> ( <i>C. applegatei</i> ssp. <i>pinetorum</i> )	wavy-leaved Indian paintbrush	PerF	RegEn	Rep	Unk	Coles and others (2008a). Previously on potential list.
Scrophulariaceae	<i>Cordylanthus kingii</i> var. <i>densiflorus</i>	saline bird's-beak	AnnF	LocEn	Rep	Unk	Coles and others (2008a). Previously on potential list.
Typhaceae	<i>Typha domingensis</i>	southern cattail	PerG	Wide	Rep	Unk	Coles and others (2008a). Previous reports have all been misidentified.
Umbelliferae (Apiaceae)	<i>Cymopterus lemmonii</i> ( <i>Pseudocymopterus montanus</i> )	Lemmon's spring-parsley	PerF	Wide	Rep	Unk	Coles and others (2008a).

\* Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-27. Changes in status for Dinosaur National Monument species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
*Polygonaceae	<i>Rumex maritimus</i> var. <i>fueginus</i> ( <i>R. fueginus</i> )	golden dock	Hist	Pres	Unc	Topp ST08190904 DINO (2009).
*Polygonaceae	<i>Rumex salicifolius</i> ( <i>R. mexicanus</i> , <i>R. triangulivalvis</i> )	willow dock	Hist	Pres	Unc	Topp ST01180907 DINO (2009).
*Rosaceae	<i>Potentilla gracilis</i> var. <i>pulcherrima</i>	beautiful cinquefoil	Hist	FalsRep	NA	Welsh 474 BRY (1956) has been annotated as var. <i>hippianoides</i> .

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-28. Revised statistical summary of the flora of Dinosaur National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	714	98	812
Full species (excluding varieties and subspecies)	677	94	771
# of Families	78	2	80
<b>Life Form Diversity</b>			
Tree taxa	13	3	16
Shrub taxa	78	15	93
Perennial forb taxa	369	48	417
Annual forb taxa	127	18	145
Perennial graminoid taxa	102	10	112
Annual graminoid taxa	11	4	15
Fern taxa	14	0	14
<b>Biogeographic Diversity</b>			
Introduced taxa	66	24	90
<b>Native taxa</b>			
Locally endemic taxa	18	2	20
Regionally endemic taxa	57	3	60
Disjunct taxa	0	0	0
Peripheral taxa	52	7	59
Sparse taxa	29	2	31
Widespread taxa	492	60	552
<i>Total native taxa</i>	<i>648</i>	<i>74</i>	<i>722</i>

This table updates Table 3.1-1 from Fertig (2009c) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.10 Fossil Butte National Monument

Since 2008, the NCPN vegetation mapping crew (Friesen et al. 2010) has added five new species to the flora of Fossil Butte National Monument (FOBU) (Table 3-29). Several additional species have been discovered or relocated during recent rare plant survey work (Fertig 2012 in prep.) and from the re-discovery of several unmounted specimens in the FOBU herbarium collected by retired monument naturalist Clay Kyte (Tables 3-29, 3-30). As a result of these studies, the number of plant species known from the monument has increased by eight (an increase of 1.5% since 2007). The total flora of FOBU now contains 554 confirmed or reported species (Table 3-31).

Several additional species reported by Friesen and others (2010) are not included in the current tally of FOBU's flora. Most of these species are considered questionable because the monument is well outside their likely range, suitable habitat is not present, or more likely look-alike species are already known from the area. To be accepted, these species need to be vouchered, photographed, or relocated. The questionable taxa include:

- *Amaranthus albus* (Amaranthaceae): previous reports have all been misidentified; more likely to be *A. blitoides*
- *Cymopterus lemmonii* (Apiaceae): outside expected range
- *Ligusticum porteri* (Apiaceae): outside expected range; reports are probably *L. filicinum*
- *Artemisia tripartita* (Asteraceae): outside expected range; reports probably based on *A. arbuscula*
- *Chaenactis stevioides* (Asteraceae): outside expected range; previous reports misidentified
- *Cryptantha cinerea* (Boraginaceae): outside expected range
- *Mertensia ciliata* (Boraginaceae): suitable habitat not present; more likely to be *M. oblongifolia*
- *Symphoricarpos occidentalis* (Caprifoliaceae): previous reports based on of *S. oreophilus*
- *Eremogone fendleri* (*Arenaria fendleri*) (Caryophyllaceae): outside expected range; reports probably based on *E. kingii*
- *Astragalus vexilliflexus* (Fabaceae): outside expected range
- *Hydrophyllum fendleri* (Hydrophyllaceae): outside expected range
- *Sisyrinchium montanum* (Iridaceae): outside expected range, previous reports based on *S. idahoense*
- *Epilobium anagallidifolium* (Onagraceae): outside expected range and lacking suitable habitat
- *Gayophytum ramosissimum* (Onagraceae): past reports based on *G. diffusum* var. *strictipes*
- *Plantago tweedy* (Plantaginaceae): more likely to be *P. eriopoda*
- *Calamagrostis canadensis* (Poaceae): outside expected range; probably *C. inexpansa*
- *Poa glaucifolia* (Poaceae): more likely to be *P. arida*
- *Phlox caespitosa* (Polemoniaceae): outside expected range
- *Eriogonum flavum* (Polygonaceae): outside expected range
- *Eriogonum umbellatum* var. *subaridum* (Polygonaceae): variety not known from Wyoming
- *Talinum parviflorum* (Portulacaceae): outside expected range
- *Thalictrum fendleri* (Ranunculaceae): reports probably based on *T. occidentale*
- *Thalictrum venulosum* (Ranunculaceae): outside of expected range; report probably based on *T. occidentale*
- *Geum rossii* (Rosaceae): suitable alpine habitat not present in monument
- *Populus deltoides* var. *wislizenii* (Salicaceae): outside expected range of var. *wislizenii*; previous reports of var. *occidentalis* have not been corroborated.

**Table 3-29. New vascular plant taxa confirmed or reported for Fossil Butte National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Asteraceae (Compositae)	<i>Crepis occidentalis</i>	basin hawksbeard	PerF	Wide	Rep	Unk	Friesen and others (2010). Var. not given, but probably var. <i>costata</i> . Previously on potential list.
*Asteraceae (Compositae)	<i>Ericameria parryi</i> var. <i>howardii</i> ( <i>Chrysothamnus parryi</i> var. <i>howardii</i> )	Parry's rubber rabbitbrush	Shrub	Wide	Rep	Unk	Observed by Sarah Topp (2008).
Brassicaceae (Cruciferae)	<i>Descurainia pinnata</i> var. <i>nelsonii</i> ( <i>D. nelsonii</i> )	western tansy-mustard	AnnF	Wide	Pres	Rare	Fertig 25733 FOBU (2010). Previously on potential list.
Caryophyllaceae	<i>Eremogone hookeri</i> ( <i>Arenaria hookeri</i> )	Hooker's sandwort	PerF	Wide	Rep	Unk	Friesen and others (2010). Probably var. <i>hookeri</i> . Previously on potential list.
Onagraceae	<i>Oenothera pallida</i>	pale evening-primrose	PerF	RegEn	Rep	Unk	Friesen and others (2010). Probably var. <i>trichocalyx</i> . Previously on potential list.
Poaceae (Gramineae)	<i>Hesperostipa comata</i> var. <i>intermedia</i> ( <i>Stipa comata</i> var. <i>intermedia</i> )	needle-and-thread	PerG	Wide	Pres	Unc	Kyte 2003-01 FOBU (2003). Previously on potential list.
Polygonaceae	<i>Eriogonum heracleoides</i>	whorled wild buckwheat	PerF	Sparse	Rep	Unk	Friesen and others (2010). Previously on potential list.
Scrophulariaceae	<i>Penstemon eatonii</i> var. <i>eatonii</i>	Eaton's firecracker penstemon	PerF	Intro*	Pres	Rare	Kyte 2003-02 FOBU (2003). Introduced in seed mix; native to SW USA.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).



**Table 3-30. Changes in status for Fossil Butte National Monument species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Compositae (Asteraceae)	<i>Tetraneuris acaulis</i> var. <i>acaulis</i> ( <i>Hymenoxys acaulis</i> var. <i>acaulis</i> )	stemless hymenoxys	Rep	Pres	Unc	Fertig 25836 FOBU (2010).
Cruciferae (Brassicaceae)	<i>Boechera holboellii</i> var. <i>secunda</i> ( <i>Arabis holboellii</i> var. <i>secunda</i> , <i>A. holboellii</i> var. <i>retrofracta</i> , <i>B. retrofracta</i> )	Holboell's rockcress	Rep	Pres	Rare	Fertig 25846 FOBU (2010).
Leguminosae (Fabaceae)	<i>Astragalus kentrophyta</i> var. <i>tegetarius</i> ( <i>A. kentrophyta</i> var. <i>implexus</i> )	mountain kentrophyta	Rep	Pres	Unc	Fertig 25747 FOBU (2010).
Violaceae	<i>Viola praemorsa</i> var. <i>altior</i> ( <i>V. nuttallii</i> var. <i>praemorsa</i> )	upland yellow violet	Rep	Pres	Rare	Fertig 25741 FOBU (2010).

**Table 3-31. Revised statistical summary of the flora of Fossil Butte National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	516	38	554
Full species (excluding varieties and subspecies)	492	36	528
Families	77	0	77
<b>Life Form Diversity</b>			
Tree taxa	5	0	5
Shrub taxa	52	4	56
Perennial forb taxa	289	25	314
Annual forb taxa	79	2	81
Perennial graminoid taxa	83	7	90
Annual graminoid taxa	6	0	6
Fern taxa	2	0	2
<b>Biogeographic Diversity</b>			
Introduced taxa	70	3	73
<b>Native taxa</b>			
Locally endemic taxa	1	0	1
Regionally endemic taxa	20	1	21
Disjunct taxa	0	0	0
Peripheral taxa	8	0	8
Sparse taxa	1	1	2
Widespread taxa	416	33	449
<i>Total native taxa</i>	<i>446</i>	<i>35</i>	<i>481</i>

This table updates Table 3.1 from Fertig and Kyte (2009) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Dorn (2001).

### 3.11 Golden Spike National Historic Site

Sarah Topp and Rebecca Weissinger visited Golden Spike National Historic Site (GOSP) in 2008 and documented five new species for the area. Three additional species were newly reported for GOSP based on the NCPN vegetation mapping project (Coles et al. 2011) (Table 3-32). Shadscale (*Atriplex confertifolia*), formerly on the reported list, has been corroborated with a voucher specimen (Table 3-33). Four species now on the confirmed or reported lists were previously

cited as potential for the park (Fertig 2009d). With these additions, the flora of GOSP now stands at 152 taxa (Table 3-34), an increase of 5.5% since 2007.

Coles and others (2011) also report small-flower globemallow (*Sphaeralcea parvifolia*) as new to GOSP. This species is closely related to Munro's globemallow (*S. munroana*) and replaces it in the Colorado Plateau. *S. parvifolia* is unlikely to be present in GOSP and reports are probably based on misidentified *S. munroana*.

**Table 3-32. New vascular plant taxa confirmed or reported for Golden Spike National Historic Site, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/ Comments
*Chenopodiaceae	<i>Krascheninnikovia lanata</i> var. <i>lanata</i> ( <i>Ceratoides lanata</i> , <i>Eurotia lanata</i> )	winterfat	Shrub	Wide	Pres	Com	Topp ST07130802 UTC (2008).
*Chenopodiaceae (Sarcobataceae)	<i>Sarcobatus vermiculatus</i>	greasewood	Shrub	Wide	Pres	Rare	Topp ST07130803 UTC (2008). Previously on potential list.
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>graveolens</i> ( <i>C. nauseosus</i> var. <i>oreophilus</i> , <i>Ericameria nauseosa</i> var. <i>graveolens</i> , <i>E. nauseosa</i> var. <i>glabrata</i> )	glabrate rabbitbrush	Shrub	Wide	Rep	Unk	Coles and others (2011).
Compositae (Asteraceae)	<i>Chrysothamnus vaseyi</i>	Vasey's rabbitbrush	Shrub	Wide	Rep	Unk	Coles and others (2011). Confirmation needed, somewhat out of range.
*Gramineae (Poaceae)	<i>Aegilops cylindrica</i> ( <i>Cylindropyrum cylindricum</i> )	jointed goatgrass	AnnG	Intro	Pres	Rare	Topp ST07110801 UTC (2008). Previously on potential list. Native to Eurasia.
Gramineae (Poaceae)	<i>Hordeum jubatum</i> ( <i>Critesion jubatum</i> )	foxtail barley	PerG	Wide	Rep	Unk	Coles and others (2011). Previously on potential list.
*Leguminosae (Fabaceae)	<i>Psoralidium lanceolatum</i> var. <i>lanceolatum</i> ( <i>Psoralea lanceolata</i> )	lemon scurf-pea	PerF	Wide	Pres	Unc	Weissinger RW07130801 UTC (2008).
*Rosaceae	<i>Purshia tridentata</i>	antelope bitterbrush	Shrub	Wide	Pres	Rare	Topp ST07130801 UTC (2008). Previously on potential list.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-33. Changes in status for Golden Spike National Historic Site species, 2008–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Chenopodiaceae	<i>Atriplex confertifolia</i>	shadscale	Rep	Pres	Unc	Crook TC07231001 UTC (2010).

**Table 3-34. Revised statistical summary of the flora of Golden Spike National Historic Site.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	143	9	152
Full species (excluding varieties and subspecies)	142	7	149
# of Families	31	1	32
<b>Life Form Diversity</b>			
Tree taxa	0	0	0
Shrub taxa	22	3	25
Perennial forb taxa	62	3	65
Annual forb taxa	37	1	38
Perennial graminoid taxa	14	2	16
Annual graminoid taxa	8	0	8
Fern taxa	0	0	0
<b>Biogeographic Diversity</b>			
Introduced taxa	41	4	45
<b>Native taxa</b>			
Locally endemic taxa	1	0	1
Regionally endemic taxa	5	0	5
Disjunct taxa	0	0	0
Peripheral taxa	2	0	2
Sparse taxa	3	0	3
Widespread taxa	91	5	96
<i>Total native taxa</i>	<i>102</i>	<i>5</i>	<i>107</i>

This table updates Table 3.1 from Fertig (2009d) and Table 6 from Fertig and others (2009c) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.12 Hovenweep National Monument

SEUG biologist Mary Moran discovered five new native plant species for Hovenweep National Monument (HOVE) while conducting field surveys in 2010 (Table 3-35). In 2011, Tony Frates, of the Utah Native Plant Society, relocated small-flower fishhook cactus (*Sclerocactus whipplei* var. *roseus*) at the Square Tower unit of the monument and documented his find with a photo (Figure

3-3). This species had previously only been reported for the area (Table 3-36). With these new discoveries, the flora of HOVE has increased to 345 species (Table 3-37), which represents a 1.5% increase since 2007 (Fertig 2009e).

The results of the NCPN vegetation mapping group were previously incorporated into the monument's annotated checklist (Fertig 2009e, Von Loh et al. 2008).



Figure 3-3. Small-flower fishhook cactus (*Sclerocactus whipplei* var. *roseus*), photographed from Hovenweep National Monument in 2011 by Tony Frates.

**Table 3-35. New vascular plant taxa confirmed or reported for Hovenweep National Monument, 2010–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Compositae (Asteraceae)	<i>Lygodesmia grandiflora</i> var. <i>arizonica</i> ( <i>L. grandiflora</i> )	Arizona rush-pink	PerF	RegEn	Pres	Unc	Moran s.n. HOVE (2010). Previously on potential list.
Liliaceae	<i>Eremocrinum albomarginatum</i>	sand lily	PerF	RegEn	Pres	Unc	Moran s.n. HOVE (2010). Previously on potential list.
Onagraceae	<i>Epilobium ciliatum</i> ( <i>E. ciliatum</i> var. <i>ciliatum</i> , <i>E. watsonii</i> , <i>E. adenocaulon</i> )	northern willow-herb	PerF	Wide	Pres	Unc	Moran s.n. HOVE (2010).
Scrophulariaceae	<i>Mimulus rubellus</i>	reddish monkeyflower	AnnF	Wide	Pres	Unc	Moran s.n. HOVE (2010). Previously on potential list.
Scrophulariaceae	<i>Penstemon angustifolius</i> var. <i>venosus</i>	veined penstemon	PerF	RegEn	Pres	Unc	Moran s.n. HOVE (2010). Previously on potential list.

**Table 3-36. Changes in status for Hovenweep National Monument species, 2010–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Cactaceae	<i>Sclerocactus whipplei</i> var. <i>roseus</i>	small-flower fishhook cactus	Rep	Pres	Unc	Frates photo (see Fig. 3-3) (2011).

**Table 3-37. Revised statistical summary of the flora of Hovenweep National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	279	66	345
Full species (excluding varieties and subspecies)	270	63	333
Families	52	8	60
<b>Life Form Diversity</b>			
Tree taxa	4	0	4
Shrub taxa	51	8	59
Perennial forb taxa	126	27	153
Annual forb taxa	56	20	76
Perennial graminoid taxa	33	8	41
Annual graminoid taxa	9	3	12
Fern taxa	0	0	0
<b>Biogeographic Diversity</b>			
Introduced taxa	45	12	57
<b>Native taxa</b>			
Locally endemic taxa	1	0	1
Regionally endemic taxa	27	6	33
Disjunct taxa	0	0	0
Peripheral taxa	19	5	24
Sparse taxa	4	1	5
Widespread taxa	183	42	225
<i>Total native taxa</i>	<i>234</i>	<i>54</i>	<i>288</i>

This table updates Table 3.1-1 from Fertig (2009e) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.13 Natural Bridges National Monument

Relatively little additional floristic work has taken place at Natural Bridges National Monument (NABR) since the publication of the annotated checklist in 2009 (Fertig 2009f). Work by the NCPN vegetation mapping group (Coles et al. 2008b) had been completed in time to be included in the 2009 checklist. Five species recognized by Coles and others (2008b) were considered questionable and are addressed in Appendix C of Fertig (2009f).

In 2009, Mary Moran of the Southeast Utah Group discovered the introduced grass yellow bluestem (*Bothriochloa ischaemum*) within NABR (Table 3-38). The following year, Mary relocated reddish monkeyflower (*Mimulus rubellus*) within the monument, changing its status from reported to present (Table 3-39). As a result of these discoveries, the flora of NABR has increased by just one species, to 429 (Table 3-40).

**Table 3-38. New vascular plant taxa confirmed or reported for Natural Bridges National Monument, 2010–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Gramineae (Poaceae)	<i>Bothriochloa ischaemum</i> ( <i>B. ischaemum</i> var. <i>songarica</i> )	yellow bluestem	PerG	Intro	Pres	Rare	Moran s.n. NABR (2009). Native to Eurasia.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-39. Changes in status for Natural Bridges National Monument species, 2010–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Scrophulariaceae	<i>Mimulus rubellus</i>	reddish monkeyflower	Rep	Pres	Unc	Moran s.n. NABR (2010).

**Table 3-40. Revised statistical summary of the flora of Natural Bridges National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	325	104	429
Full species (excluding varieties and subspecies)	313	95	408
Families	62	3	65
<b>Life Form Diversity</b>			
Tree taxa	12	2	14
Shrub taxa	56	18	74
Perennial forb taxa	153	48	201
Annual forb taxa	41	28	69
Perennial graminoid taxa	51	5	56
Annual graminoid taxa	5	3	8
Fern taxa	7	0	7
<b>Biogeographic Diversity</b>			
Introduced taxa	31	16	47
<b>Native taxa</b>			
Locally endemic taxa	8	1	9
Regionally endemic taxa	47	16	63
Disjunct taxa	0	0	0
Peripheral taxa	3	1	4
Sparse taxa	1	1	2
Widespread taxa	235	69	304
<i>Total native taxa</i>	<i>294</i>	<i>88</i>	<i>382</i>

This table updates Table 3.1 from Fertig (2009f) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.14 Pipe Spring National Monument

Since 2008–2011, 56 new plant species have been documented as present or historical in Pipe Spring National Monument (PISP) (Table 3-41). Of these, 11 came from examination of specimens in the PISP herbarium that were not mounted or available when the 2008 annotated checklist was prepared (Fertig and Alexander 2008). The remaining 45 were collected or observed by Walter Fertig and Janet Coles during floristic or vegetation mapping surveys in 2008 and 2011 (Coles et al. 2008c, Fertig 2008). These surveys also resulted in the relocation and confirmation of 26 species previously reported (but not vouchered) for the monument and rediscovery of another 10 historical species (Table 3-42). As a result of these studies the known flora of PISP has increased from 277 to 330 species (Table 3-43), a net increase of 19%.

Among the newly documented species are 24 plant taxa cultivated in the monument's native peoples and pioneer garden. Another 11 non-native but naturalized species have been added to the flora, bringing the total number of introduced species to 93 (an increase of 60%).

Four new families are now represented in the PISP flora. These include the Pedaliaceae (sesame family), Santalaceae (sandalwood

family), Vitaceae (grape family), and Zannichelliaceae (horned pondweed family). The Pedaliaceae and Vitaceae are represented only by cultivated plants.

Four species that have been cited for PISP are now considered falsely reported. Historical records from the PISP herbarium for scarlet gaura (*Gaura coccinea*) and cushion milkwort (*Polygala subspinoso*) are based on specimens collected elsewhere in Arizona. Removal of *P. subspinoso* from the monument flora also results in the elimination of the Polygalaceae family. Two other specimens from the herbarium are misidentified: Fremont's goosefoot (*Chenopodium fremonti* var. *fremontii*) is actually silvery goosefoot (*Chenopodium fremonti* var. *incanum*), new to the monument, and Baker's cryptanth (*Cryptantha bakeri*) is Jones' popcornflower (*Plagiobothrys jonesii*) (Table 3-42).

Coles and others (2008c) reported one additional species for the monument flora (without a voucher) that is likely an error. The report of field mint (*Mentha arvensis*) is probably based on a misidentification of spearmint (*Mentha × spicata*), which is a conspicuous species at the West Cabin Spring and along the rock-lined overflow channel of the Castle pond. Both species are superficially similar and easily mistaken for the other.



**Table 3-41. New vascular plant taxa confirmed or reported for Pipe Spring National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Amaranthaceae	<i>Amaranthus albus</i>	tumble pigweed	AnnF	Intro	Pres	Rare	Fertig & Fertig 26970 PISP (2011). Previously on potential list.
Amaranthaceae	<i>Amaranthus palmeri</i>	Palmer's amaranth	AnnF	Wide	Pres	Rare	Fertig 27239 (2011).
*Amaranthaceae	<i>Amaranthus retroflexus</i>	redroot pigweed	AnnF	Intro	Pres	Unc	Fertig 24316 PISP (2008). Previously on potential list. Native to Central America.
*Boraginaceae	<i>Cryptantha recurvata</i>	recurved cryptanth	AnnF	Wide	Pres	Rare	Fertig 23827 PISP (2008). Previously on potential list.
*Chenopodiaceae	<i>Atriplex rosea</i>	tumbling orach	AnnF	Intro	Pres	Rare	Fertig 24328 PISP (2008). Native to Eurasia.
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>incanum</i> ( <i>C. incanum</i> )	silvery goosefoot	AnnF	Wide	Pres	Unc	Alexander 1192 PISP (2001). Specimen was previously identified as var. <i>fremontii</i> .
*Compositae (Asteraceae)	<i>Chaenactis stevioides</i>	stevia dusty-maiden	AnnF	Wide	Pres	Rare	Fertig 23825 PISP (2008). Previously on potential list.
Compositae (Asteraceae)	<i>Glyptoleura setulosa</i>	setose crustweed	AnnF	Wide	Hist	Rare	Heaton s.n. PISP (1937). Previously on potential list.
Compositae (Asteraceae)	<i>Haplopappus gracilis</i> ( <i>Machaeranthera gracilis</i> , <i>Xanthisma gracile</i> )	slender goldenweed	AnnF	Wide	Pres	Rare	Fertig 27083 PISP (2011).
*Compositae (Asteraceae)	<i>Helianthus annuus</i> var. <i>macrocarpus</i>	cultivated sunflower	AnnF	Intro	Pres	Unc	Fertig & Fertig 26967 PISP (2011). Native to C North America. Cultivated.
*Compositae (Asteraceae)	<i>Taraxacum officinale</i>	common dandelion	PerF	Intro	Pres	Unc	Fertig 23818 PISP (2008). Previously on potential list. Native to Eurasia.
*Cruciferae (Brassicaceae)	<i>Brassica oleracea</i> var. <i>capitata</i>	cabbage	AnnF	Intro	Pres	Unc	Observed by Fertig (2008). Native to Europe. Cultivated.
Cruciferae (Brassicaceae)	<i>Chorispora tenella</i>	blue mustard	AnnF	Intro	Pres	Unc	Louie & Malm s.n. PISP (2001). Previously on potential list.
*Cruciferae (Brassicaceae)	<i>Lepidium lasiocarpum</i> var. <i>lasiocarpum</i>	hairy-pod pepperwort	AnnF	Wide	Pres	Unc	Fertig 23822 PISP (2008).
Cruciferae (Brassicaceae)	<i>Lepidium virginicum</i> var. <i>pubescens</i>	poor-man's pepperwort	AnnF	Wide	Pres	Unc	Alexander & Decker s.n. PISP (2003). Previously on potential list.
*Cruciferae (Brassicaceae)	<i>Raphanus sativus</i>	radish	AnnF	Intro	Pres	Unc	Fertig observation (2008). Native to Europe. Cultivated.
*Cucurbitaceae	<i>Citrullus lanatus</i>	watermelon	AnnF	Intro	Pres	Unc	Fertig et al. 26895 PISP (2011). Native to Africa. Cultivated.
*Cucurbitaceae	<i>Cucumis melo</i>	cantaloupe	AnnF	Intro	Pres	Unc	Fertig 27987 PISP(2008). Native to Africa & Asia. Cultivated.
*Cucurbitaceae	<i>Cucurbita maxima</i>	winter squash	AnnF	Intro	Pres	Unc	Fertig observation (2008). Native to Central America. Cultivated.

**Table 3-41. New vascular plant taxa confirmed or reported for Pipe Spring National Monument, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Cucurbitaceae	<i>Cucurbita moschata</i>	butternut squash	AnnF	Intro	Pres Obs.	Unc	Fertig observation (2008). Native to Central America. Cultivated.
*Cucurbitaceae	<i>Cucurbita pepo</i>	pumpkin, zucchini	AnnF	Intro	Pres	Unc	Fertig 27084 PISP (2011). Native to Central America. Cultivated.
*Cucurbitaceae	<i>Lagenaria siceraria</i>	bottle gourd	AnnF	Intro	Pres	Unc	Fertig & Fertig 26973 PISP (2011). Native to Old World. Cultivated.
Gramineae	<i>Digitaria sanguinalis</i>	hairy crabgrass	AnnG	Intro	Pres	Rare	Fertig 27092 PISP (2011). Native to Europe.
*Gramineae (Poaceae)	<i>Festuca octoflora</i> ( <i>Vulpia octoflora</i> )	sixweeks fescue	AnnG	Wide	Pres	Rare	Fertig 23828 PISP (2008). Previously on potential list.
*Gramineae (Poaceae)	<i>Paspalum distichum</i>	knotgrass	PerG	Wide	Pres	Unc	Fertig 24333 PISP (2008).
*Gramineae (Poaceae)	<i>Poa compressa</i>	Canada bluegrass	PerG	Intro	Pres	Rare	Fertig 23817 PISP (2008). Native to Eurasia.
*Gramineae (Poaceae)	<i>Sorghum bicolor</i>	grain sorghum	PerG	Intro	Pres	Unc	Fertig et al. 26898 PISP (2011). Native to Europe. Cultivated.
*Gramineae (Poaceae)	<i>Triticum aestivum</i>	wheat	AnnG	Intro	Pres	Rare	Fertig 23824 PISP (2008). Previously on potential list. Native to Eurasia.
*Gramineae (Poaceae)	<i>Zea mays</i>	corn	AnnG	Intro	Pres	Unc	Fertig et al. 26892 PISP (2011). Native to Central America. Cultivated.
*Leguminosae (Fabaceae)	<i>Phaseolus acutifolius</i>	teparty bean	AnnF	Intro	Pres Obs.	Unc	Fertig observation (2008). Native to Central America. Cultivated.
Leguminosae (Fabaceae)	<i>Phaseolus vulgaris</i>	common bean	AnnF	Intro	Pres	Unc	Fertig 27091 PISP (2011). Native to Central America. Cultivated.
*Liliaceae (Alliaceae)	<i>Allium cepa</i>	cultivated onion	PerF	Intro	Pres Obs.	Unc	Fertig observation (2008). Native to Europe. Cultivated.
*Liliaceae (Asparagaceae)	<i>Asparagus officinalis</i>	asparagus	PerF	Intro	Pres	Rare	Fertig 24324 PISP(2008). Native to Eurasia.
*Malvaceae	<i>Abelmoschus esculentus</i>	okra	AnnF	Intro	Pres	Unc	Fertig & Fertig 26968 PISP (2011). Native to Asia. Cultivated.
*Malvaceae	<i>Gossypium hirsutum</i>	upland cotton	AnnF	Intro	Pres	Unc	Fertig 27089 PISP (2008). Native to tropical America. Cultivated.
Nyctaginaceae	<i>Tripterocalyx micranthus</i> ( <i>Abronia micrantha</i> , <i>T. pedunculatus</i> )	small-flower sandpuffs	AnnF	Wide	Hist	Unk	Heaton s.n. PISP (1936). Specimen relocated at PISP. Previously on potential list.
*Pedaliaceae (Martyiaceae)	<i>Proboscidea parviflora</i>	devil's claw	AnnF	Wide	Pres	Unc	Fertig 27085 PISP (2008). Cultivated.

Table 3-41. New vascular plant taxa confirmed or reported for Pipe Spring National Monument, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Polemoniaceae	<i>Linanthus bigelovii</i>	Bigelow's linanthus	AnnF	Wide	Pres	Rare	Fertig 23837 PISP (2008).
Polemoniaceae	<i>Linanthus dichotomus</i>	evening-snow	AnnF	Wide	Pres	Unc	Alexander & Decker 1442 PISP (2003). Previously on potential list.
Polygonaceae	<i>Polygonum lapathifolium</i> ( <i>Persicaria lapathifolia</i> )	willow-weed	AnnF	Intro	Pres	Rare	Whitehead s.n. PISP (1936) relocated in PISP herbarium. Observed by Fertig, (2011) in pond on duck platform. Native to Eurasia.
Ranunculaceae	<i>Ranunculus sceleratus</i> var. <i>multifidus</i> ( <i>Hecatonia scelerata</i> )	blister buttercup	AnnF	Wide	Pres	Unc	Alexander & Decker 1412 PISP (2003). Previously on potential list.
Ranunculaceae	<i>Ranunculus testiculatus</i> ( <i>Ceratocephala testiculata</i> )	bur buttercup	AnnF	Intro	Pres	Unc	Alexander & Decker 1411 PISP (2003). Previously on potential list.
Rosaceae	<i>Prunus persica</i>	peach	Tree	Intro	Pres	Unc	Fertig 27097 PISP (2011). Native to China. Cultivated.
Santalaceae	<i>Comandra umbellata</i> var. <i>pallida</i> ( <i>C. pallida</i> )	bastard toadflax	PerF	Wide	Hist	Unk	Heaton s.n. PISP (1939). Specimen relocated at PISP. Previously on potential list.
Scrophulariaceae	<i>Castilleja scabrida</i> var. <i>scabrida</i>	Eastwood's paintbrush	PerF	RegEn	Pres	Unc	Alexander & Decker s.n. PISP (2003). Specimen relocated at PISP. Previously on potential list.
*Solanaceae	<i>Capsicum frutescens</i>	bell pepper	AnnF	Intro	Pres	Unc	Fertig observation (2008). Native to Old World. Cultivated.
Solanaceae	<i>Lycium andersonii</i>	Anderson's wolfberry	Shrub	Wide	Pres	Unc	Alexander & Decker 1445 PISP (2003). Specimen relocated at PISP. Previously on potential list.
*Solanaceae	<i>Lycopersicon esculentum</i>	tomato	AnnF	Intro	Pres	Unc	Fertig observation (2008). Native to South America. Cultivated.
Solanaceae	<i>Nicotiana attenuata</i>	coyote tobacco	AnnF	Wide	Pres	Rare	Fertig 27241 PISP (2011).
*Solanaceae	<i>Physalis hederifolia</i> var. <i>fendleri</i> ( <i>P. fendleri</i> )	Fendler's ground-cherry	PerF	Wide	Press	Unc	Fertig 24325 PISP (2008).
Solanaceae	<i>Solanum triflorum</i>	cut-leaf nightshade	AnnF	Intro	Pres	Unc	Fertig et al. 26910 PISP (2011). Native to Europe.
*Solanaceae	<i>Solanum tuberosum</i>	potato	PerF	Intro	Pres	Unc	Fertig et al. 26901 PISP (2011). Native to South America. Cultivated.
*Umbelliferae (Apiaceae)	<i>Daucus carota</i>	carrot, Queen Anne's-lace	PerF	Intro	Pres	Unc	Fertig observation (2008). Native to Eurasia. Cultivated.
Vitaceae	<i>Vitis labrusca</i>	northern fox grape	Shrub	Intro	Pres	Unc	Fertig et al. 26908 PISP (2011). Native to E North America. Cultivated.

**Table 3-41. New vascular plant taxa confirmed or reported for Pipe Spring National Monument, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Vitaceae	<i>Vitis vinifera</i>	wine grape	Shrub	Intro	Pres	Unc	Fertig & Fertig 26966 PISP (2008). Native to Eurasia. Cultivated.
*Zannichelliaceae	<i>Zannichellia palustris</i>	horned pondweed	PerF	Wide	Pres	Unc	Fertig 23835 PISP (2008).

\* Indicates species cited in previous updates by Fertig (2008) and Fertig and others (2009c) or (2010).

**Table 3-42. Changes in status for Pipe Spring National Monument species, 2010–2011.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Apocynaceae	<i>Apocynum cannabinum</i>	common dogbane	Rep	Pres	Rare	Fertig et al. 26907 PISP (2011).
Boraginaceae	<i>Cryptantha bakeri</i>	Baker's cryptanth	Pres (cited in Fertig 2008)	Fals Rep	NA	Fertig 28329 (PISP) is based on a misidentified specimen of <i>Plagiobothrys jonesii</i> .
Boraginaceae	<i>Cryptantha crassisepala</i> var. <i>elachantha</i>	thick-sepaled cryptanth	Hist	Pres	Unc	Alexander & Decker s.n. PISP (2003).
*Boraginaceae	<i>Cryptantha gracilis</i>	slender cryptanth	Hist	Pres	Unc	Fertig 23830 PISP (2008).
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>fremontii</i>	Fremont's goosefoot	Pres	Fals Rep	NA	Alexander 1192 PISP (2001) is based on a misidentified specimen of <i>C. fremontii</i> var. <i>incanum</i> .
Chenopodiaceae	<i>Chenopodium leptophyllum</i>	narrowleaf goosefoot	Rep	Hist	Unk	Heaton s.n. PISP (1935). Specimen rediscovered at PISP.
*Chenopodiaceae	<i>Krascheninnikovia lanata</i> var. <i>subspinoso</i>	winterfat	Hist	Pres Obs.	Unc	Observed in vegetative condition by Fertig (2008).
*Compositae (Asteraceae)	<i>Artemisia bigelovii</i>	Bigelow's sagebrush	Rep	Pres	Unc	Fertig 24327 PISP (2008).
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>viscidiflorus</i>	green rabbitbrush	Rep	Pres	Com	Coles JC08020701 PISP (2008).
*Compositae (Asteraceae)	<i>Conyza canadensis</i> var. <i>glabrata</i>	Canadian horseweed	Rep	Pres	Unc	Fertig 24334 PISP (2008).
Compositae (Asteraceae)	<i>Onopordum acanthium</i>	Scotch thistle	Rep	Pres	Unc	Fertig et al. 26906 PISP (2011). Introduced from Eurasia. AZ state prohibited & restricted noxious weed.
Compositae (Asteraceae)	<i>Sonchus oleraceus</i>	common sowthistle	Rep	Pres	Unc	Fertig 27096 PISP (2008). Introduced from Europe.
Compositae (Asteraceae)	<i>Xanthium strumarium</i> var. <i>canadense</i>	rough cocklebur	Rep	Hist	Unk	Whitehead s.n. PISP (1936). Specimen relocated at PISP.
*Cruciferae (Brassicaceae)	<i>Arabis perennans</i> var. <i>perennans</i>	perennial rockcross	Rep	Pres	Unc	Fertig 23832 PISP (2008).
Cruciferae (Brassicaceae)	<i>Lepidium perfoliatum</i>	clasping pepperwort	Hist	Pres	Unc	Louie & Malm s.n. PISP (2001).
*Cruciferae (Brassicaceae)	<i>Streptanthella longirostris</i>	long-beak fiddle-mustard	Hist	Pres	Com	Fertig 23823 PISP (2008).
Cyperaceae	<i>Cyperus esculentus</i>	chufa flat-sedge	Rep	Pres	Unc	Fertig 27095 PISP (2011). Previously cited as " <i>Cyperus</i> sp." Introduced from tropical America.
Gramineae (Poaceae)	<i>Bouteloua curtipendula</i>	sideoats grama	Rep	Pres	Unc	Fertig et al. 26891 PISP (2011).

**Table 3-42. Changes in status for Pipe Spring National Monument species, 2010–2011, cont.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Gramineae (Poaceae)	<i>Cenchrus longispinus</i>	field sandbur	Rep	Pres	Rare	Fertig & Fertig 26971 PISP (2011).
Gramineae (Poaceae)	<i>Distichlis spicata</i>	desert saltgrass	Rep	Pres Obs.	Rare	Fertig observation (2011). Specimen too withered to collect in mid August.
*Gramineae (Poaceae)	<i>Echinochloa crus-galli</i>	barnyard-grass	Rep	Pres	Unc	Fertig 24323 PISP (2008). Introduced from Eurasia.
*Gramineae (Poaceae)	<i>Elymus elymoides</i>	squirreltail	Rep	Pres	Unc	Fertig 23821 PISP (2008).
*Gramineae (Poaceae)	<i>Eragrostis cilianensis</i>	stinkgrass	Rep	Pres	Unc	Fertig 24318 PISP (2008). Introduced from Eurasia.
*Gramineae (Poaceae)	<i>Poa pratensis</i>	Kentucky bluegrass	Pres	Pres	Unk	Observed by Fertig (2008); Heaton s.n. PISP (1938). Introduced from Europe.
*Gramineae (Poaceae)	<i>Polypogon semiverticillatus</i>	water polypogon	Rep	Pres	Rare	Fertig 24321 (2008). Introduced from Eurasia & Africa.
*Gramineae (Poaceae)	<i>Sporobolus airoides</i> var. <i>airoides</i>	alkali sacaton	Rep	Pres	Unc	Fertig 24335 PISP (2008).
*Gramineae (Poaceae)	<i>Stipa hymenoides</i>	Indian ricegrass	Pres Obs.	Pres	Unc	Fertig 23820 PISP (2008).
*Iridaceae	<i>Sisyrinchium demissum</i>	blue-eyed grass	Rep	Pres	Rare	Fertig 24329 PISP (2008).
Leguminosae (Fabaceae)	<i>Astragalus praelongus</i> var. <i>praelongus</i>	stinking milkvetch	Rep	Pres	Unc	Alexander & Decker s.n. PISP (1998). Mistakenly cited as “reported” in Fertig & Alexander 2008.
*Leguminosae (Fabaceae)	<i>Melilotus alba</i>	white sweet-clover	Rep	Pres	Unc	Fertig 24331 PISP (2008).
*Malvaceae	<i>Sphaeralcea parvifolia</i>	small-leaf globemallow	Hist	Pres Obs.	Unc	Observed by Fertig (2008).
Onagraceae	<i>Gaura coccinea</i>	scarlet gaura	Hist	Fals Rep	NA	Heaton s.n. collection at PISP was taken from Cedar Ridge, 10 miles W of Pipe Springs and outside the monument.
Polemoniaceae	<i>Eriastrum eremicum</i>	Mohave eriastrum	Hist	Pres Obs.	Unc	Observed by Fertig in fruit (2011).
*Polemoniaceae	<i>Ipomopsis polycladon</i>	spreading gilia	Hist	Pres	Unc	Fertig 23831 PISP (2008).
Polygalaceae	<i>Polygala subspinosa</i>	cushion milkwort	Hist	Fals Rep	NA	Heaton s.n. collection at PISP was taken from Cedar Ridge, 10 miles W of Pipe Springs and outside the monument.
Polygonaceae	<i>Rumex crispus</i>	curly dock	Rep	Pres	Unc	Fertig et al. 26905 PISP (2011). Introduced from Eurasia.
Scrophulariaceae	<i>Penstemon utahensis</i>	Utah penstemon	Hist	Pres	Unc	Louie & Malm s.n. PISP (2001). Specimen relocated at PISP.

**Table 3-42. Changes in status for Pipe Spring National Monument species, 2010–2011, cont.**

Family	Scientific name	Common name	Previous status	Current status	Pop size	Revised source (year)
Solanaceae	<i>Nicotiana trigonophylla</i>	desert tobacco	Hist	Pres	Unc	Relocated by Amber van Alfen (2011).
Solanaceae	<i>Physalis hederifolia</i> var. <i>palmeri</i>	Palmer's ground-cherry	Rep	Hist	Unk	Whitehead s.n. PISP (1935). Specimen relocated at PISP.
*Solanaceae	<i>Solanum sarrachoides</i>	ground-cherry nightshade	Rep	Pres	Rare	Fertig 24320 PISP (2008). Introduced from South America.
*Tamaricaceae	<i>Tamarix chinensis</i>	five-stamen tamarisk	Rep	Pres	Rare	Fertig 24322 PISP (2008). Introduced from Eurasia.

\*Indicates species cited in previous updates by Fertig (2008) and Fertig and others (2009c) or (2010).

**Table 3-43. Revised statistical summary of the flora of Pipe Spring National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	293	37	330
Full species (excluding varieties and subspecies)	279	34	313
Families	59	0	59
<b>Life Form Diversity</b>			
Tree taxa	9	2	11
Shrub taxa	39	4	43
Perennial forb taxa	86	19	105
Annual forb taxa	113	2	115
Perennial graminoid taxa	30	9	39
Annual graminoid taxa	16	1	17
Fern taxa	0	0	0
<b>Biogeographic Diversity</b>			
Introduced taxa	81	12	93
<b>Native taxa</b>			
Locally endemic taxa	4	0	4
Regionally endemic taxa	16	6	22
Disjunct taxa	0	0	0
Peripheral taxa	4	1	5
Sparse taxa	1	0	1
Widespread taxa	187	18	205
<i>Total native taxa</i>	<i>212</i>	<i>25</i>	<i>237</i>

This table updates Table 3.1 from Fertig and Alexander (2008) and Table 1 from Fertig (2008) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).



### 3.15 Timpanogos Cave National Monument

Since 2008, the NCPN vegetation mapping group (Coles et al. 2009b) has added 10 new species to the flora of Timpanogos Cave Na-

tional Monument (TICA) (Table 3-44). All of these new taxa are unvouchered. The total number of species now recognized in the monument is 245 (Table 3-45), an increase of 4.3% from 2007 (Fertig and Atwood 2009).

**Table 3-44. New vascular plant taxa confirmed or reported for Timpanogos Cave National Monument, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Boraginaceae	<i>Lappula occidentalis</i> ( <i>L. redowskii</i> var. <i>cupulata</i> , <i>L. marginata</i> , <i>L. texana</i> )	cupseed stickseed	AnnF	Wide	Rep	Unk	Coles and others (2009b). Probably var. <i>cupulata</i> . Previously on potential list.
Chenopodiaceae	<i>Bassia americana</i> ( <i>Kochia americana</i> )	greenmolly	PerF	Wide	Rep	Unk	Coles and others (2009b).
*Compositae (Asteraceae)	<i>Artemisia nova</i> var. <i>nova</i> ( <i>Seriphidium novum</i> , <i>A.</i> <i>arbuscula</i> var. <i>nova</i> )	black sagebrush	Shrub	Wide	Rep	Unk	Williams observation (2007); Coles and others (2009b).
Compositae (Asteraceae)	<i>Brickellia oblongifolia</i> var. <i>linifolia</i>	Mohave brickellbush	Shrub	Wide	Rep	Unk	Coles and others (2009b). Type locality: American Fork, Utah Co, (Watson 493 YU).
Compositae (Asteraceae)	<i>Chrysothamnus</i> <i>nauseosus</i> var. <i>graveolens</i> ( <i>Ericameria nauseosa</i> var. <i>graveolens</i> , <i>E.</i> <i>nauseosa</i> var. <i>glabrata</i> )	glabrate rabbitbrush	Shrub	Wide	Rep	Unk	Coles and others (2009b). Previously on potential list.
Compositae (Asteraceae)	<i>Haplopappus</i> <i>macronema</i> ( <i>Ericameria discoidea</i> , <i>Macronema discoidea</i> )	narrowleaf goldenweed	Shrub	Wide	Rep	Unk	Coles and others (2009b). Previously on potential list.
Gramineae (Poaceae)	<i>Panicum capillare</i>	witchgrass	AnnG	Wide	Rep	Unk	Coles and others (2009b).
Gramineae (Poaceae)	<i>Stipa lettermanii</i> ( <i>Achnatherum</i> <i>lettermanii</i> )	Letterman's needlegrass	PerG	Wide	Rep	Unk	Coles and others (2009b). Previously on falsely reported list.
Scrophulariaceae	<i>Penstemon</i> <i>pachyphyllus</i>	thickleaf penstemon	PerF	RegEn	Rep	Unk	Coles and others (2009b). Variety not given, but probably var. <i>pachyphyllus</i>
Solanaceae	<i>Solanum sarrachoides</i> ( <i>S. villosum</i> , <i>S.</i> <i>physalifolium</i> var. <i>nitidibaccatum</i> )	ground-cherry nightshade	AnnF	Intro	Rep	Unk	Coles and others (2009b). Previously on potential list. Native to South America.

\*Indicates species cited in previous updates by Fertig (2008) and Fertig and others (2009c) or (2010).

**Table 3-45. Revised statistical summary of the flora of Timpanogos Cave National Monument.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	235	10	245
Full species (excluding varieties and subspecies)	231	9	240
Families	51	0	51
<b>Life Form Diversity</b>			
Tree taxa	14	0	14
Shrub taxa	34	4	38
Perennial forb taxa	122	2	124
Annual forb taxa	36	2	38
Perennial graminoid taxa	21	1	22
Annual graminoid taxa	6	1	7
Fern taxa	2	0	2
<b>Biogeographic Diversity</b>			
Introduced taxa	63	1	64
<b>Native taxa</b>			
Locally endemic taxa	5	0	5
Regionally endemic taxa	10	1	11
Disjunct taxa	0	0	0
Peripheral taxa	2	0	2
Sparse taxa	2	0	2
Widespread taxa	153	8	161
<i>Total native taxa</i>	<i>172</i>	<i>9</i>	<i>181</i>

This table updates Table 3.1 from Fertig and Atwood (2009) and reflects new species discovered or relocated from 2008 to 2011. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).

### 3.16 Zion National Park

Since 2008, 83 new plant species have been documented for Zion National Park (ZION) (Table 3-46, Figure 3-4). Of these, 53 have been confirmed with voucher specimens or photographs, while 30 are reported from recent literature (Ott 2010). Another 16 species that had been known only from historical records have been relocated and 12 literature reports have been verified with new collections or photographs (Table 3-47, Figure 3-5). With these discoveries, the total confirmed and reported flora of ZION now stands at 1,074 taxa (Table 3-48), an increase of 8.5% (Fertig and Alexander 2009). ZION has surpassed Grand Staircase-Escalante National Monument as the Utah park with the highest vascular plant species richness (Fertig 2009h).

New species discoveries in ZION have come from a variety of sources. Current and former NPS employees in the vegetation, weed, and fire programs, including Cheryl Decker, Becca Lieberg, Kezia Nielsen, Brian Black, Joel Silverman, and Donna Shorrock, have added at least a dozen new species to the park flora. Ryan Meszaros, Brian Franzone, and fellow students from Northern Arizona University discovered or relocated nine taxa during research on fire ecology in the Crater Hill area of Zion (Fertig et al. 2010). Jeff Ott, a recent doctoral student from the University of North Carolina, added nearly 30 new reports through his tabulation of plot data and species lists from Harper (1993) and Cogan and others (2004). About two dozen new or rediscovered species reports have come from rare plant surveys (Fertig 2010a, 2011). Dedicated amateur botanists and vacationing scientists, such as Derrick Zobell, Margaret Malm, and Steve McKee, have also contributed a dozen new records.

Twenty-two new species documented since 2008 are exotic plants, giving the park 162 non-native species (Table 3-48). Although none of the new species is officially designated as a noxious weed by the State of Utah, several are of potential management concern, including giant reed (*Arundo donax*), Chilean chess (*Bromus trinii*), Himalayan blackberry (*Rubus discolor*), and grain sorghum (*Sorghum bicolor*). One of the newly documented introduced species, hemp (*Cannabis sativa*), has already been extirpat-

ed from the park due to the diligence of park staff. Most of the new weed species are appearing in recently burned areas, trailheads, campgrounds, or park housing.

Three newly discovered species from ZION are local or regional endemics that might warrant special management attention. Enterprise milkvetch (*Astragalus convallarius* var. *finitimus*) is restricted to the Kolob Terrace/Pine Valley Mountain area of Utah and adjacent Nevada. It was first discovered in the park in 2001, and a second site was found on Chinle soils bordering a small creek draining Smith Mesa in 2011. Sand dune nodding wild buckwheat (*Eriogonum cernuum* var. *psammophilum*) is a robust form of *E. cernuum* known from the East Entrance burn area and only described as a new taxon in 2008 (Welsh et al. 2008). Cedar Canyon pepperwort (*Lepidium montanum* var. *heterophyllum*) is endemic to south-central Utah and was discovered by Derrick Zobell in the Kolob area in 2010 (Figure 3-4). The abundance, distribution, potential threats, and management needs of each of these species is poorly known in the park and across their limited ranges.

The status of one of ZION's rarest plant species may need to be reassessed. Joel Tuhy, of the Utah Nature Conservancy, has questioned whether specimens of Paria breadroot (*Pediomelum pariense*) that he and other colleagues from Brigham Young University collected from the Checkerboard Mesa area in 1987 were actually taken from the park, or just outside of ZION on BLM lands (Tuhy personal communication, June 2011). These exposures of Carmel limestone should be revisited to determine whether this southern Utah endemic is actually part of the ZION flora.

An additional 45 species were reported for ZION by Ott (2010) without vouchers. For now, these species are considered questionable, because ZION is outside their known range, lacks suitable habitat, or other look-alike species are already present. Confirmation of these reports is needed with photos or corroborated vouchers:

- *Opuntia basilaris* (Cactaceae): all other reports are based on *O. erinacea* var. *aurea*

- *Artemisia arbuscula* (Compositae): report by Ott (2010) probably based on *A. nova*; outside expected range and suitable habitat not present
- *Chrysothamnus nauseosus* var. *nauseosus* (*Ericameria nauseosa* var. *nauseosa*) (Compositae): outside expected range
- *Chrysothamnus parryi* var. *parryi* (*Ericameria parryi* var. *parryi*) (Compositae): more likely to be var. *howardii* or *nevadensis*
- *Chrysothamnus viscidiflorus* ssp. *axillaris* (Compositae): considered a synonym of var. *stenophyllus* by Welsh and others (2008)
- *Erigeron argentatus* (Compositae): questionable; more likely to be *E. utahensis*
- *Geraea canescens* (Compositae): outside expected range
- *Haplopappus laricifolius* (Compositae): outside expected range; more likely to be *H. linearifolius*
- *Heterotheca viscida* (Compositae): probably a typographical error and meant to be *H. villosa* (now *Chrysopsis villosa*); not known from Utah
- *Hypochaeris radicata* (Compositae): outside expected range; report may be based on *Taraxacum* or *Crepis* spp.
- *Lygodesmia juncea* (Compositae): previous reports have all been misidentified
- *Stephanomeria runcinata* (Compositae): outside expected range
- *Townsendia montana* (Compositae): suitable habitat probably lackisalix
- ng; outside expected range
- *Caulanthus cooperi* (Cruciferae): cited by Ott (2010), but suitable habitat probably lacking in ZION; report may be based on *Streptanthella longirostris*
- *Draba verna* (Cruciferae): previously cited as falsely reported; outside expected range; report may be based on misidentified *D. cuneifolia*
- *Carex geyeri* (Cyperaceae): previous reports from ZION have all been misidentified
- *Carex utriculata* (Cyperaceae) previous reports from ZION have all been misidentified
- *Scirpus americanus* (*Schoenoplectus americanus*) (Cyperaceae): report probably based on *S. pungens*
- *Swertia utahensis* (Gentianaceae): outside expected range; report probably based on *S. albomarginata*
- *Achnatherum contractum* (*Oryzopsis contracta*) (Gramineae): well outside expected range; probably based on *Stipa hymenoides* or a hybrid
- *Aristida purpurascens* (Gramineae): this Great Plains species is not known from Utah; report probably based on *A. purpureus*
- *Bromus vulgaris* (Gramineae): cited by Ott (2010), but outside known range
- *Elymus smithii* (*Pascopyrum smithii*) (Gramineae): previous reports based on *E. lanceolatus*
- *Festuca occidentalis* (Gramineae): outside expected range
- *Muhlenbergia wrightii* (Gramineae): previous reports have all been misidentified
- *Stipa viridula* (*Nassella viridula*) (Gramineae): outside expected range
- *Luzula campestris* (Juncaceae): outside expected range
- *Luzula parviflora* (Juncaceae): all previous reports have been based on misidentified *Juncus* spp.
- *Krameria* sp. (Krameriaceae): outside expected range; report probably based on *Coleogyne ramosissima*
- *Allium macropetalum* (Liliaceae): outside expected range
- *Streptopus amplexifolius* (Liliaceae): outside expected range
- *Sphaeralcea coccinea* (Malvaceae): previous reports have all been based on misidentified specimens
- *Phlox caespitosa* (Polemoniaceae) : outside expected range
- *Phlox hoodii* (Polemoniaceae): previous reports all misidentified
- *Eriogonum flavum* (Polygonaceae) well outside known range; most likely *E. jamesii* var. *rupicola*
- *Eriogonum heracleioides* (Polygonaceae): outside expected range

- *Salix ligulifolia* (Salicaceae): probably based on *S. eriocephala* var. *watsonii*
- *Castilleja flava* (Scrophulariaceae): previous reports all misidentified
- *Penstemon angustifolius* (Scrophulariaceae): outside expected range
- *Penstemon caespitosus* (including *P. tusharensis*) (Scrophulariaceae): lacking suitable habitat
- *Penstemon lentus* (Scrophulariaceae): well outside expected range
- *Penstemon leonardii* (Scrophulariaceae): probably based on *P. higginsii*
- *Physalis heterophylla* (Solanaceae): outside expected range: report probably based on *P. hederifolia*
- *Typha angustifolia* (Typhaceae): previous reports from ZION all based on *T. domingensis*
- *Viola nuttallii* (Violaceae): well outside known range; reports may be based on *V. praemorsa*.





Figure 3-4. New plant species from Zion National Park. Clockwise from top left: upland yellow violet (*Viola praemorsa*), discovered from the Lava Point area and photographed by Derrick Zobell. Tall cinquefoil (*Potentilla arguta* var. *convallaria*), photographed by D. Zobell near Lava Point in 2011. Spiny goldenweed (*Haplopappus spinulosus* var. *gooddingii*), photographed by D. Zobell near the Human History Museum in 2010. An unusual, whitish-flowered phase of hook-spur violet (*Viola adunca*), discovered independently within a week in spring 2011 along the East Rim Trail by Walter Fertig and Peter Lesica & Derrick Zobell (P. Lesica photo). The rare Cedar Canyon pepperwort (*Lepidium montanum* var. *heterophyllum*), photographed by D. Zobell in the Kolob area in 2010.





Figure 3-5. Plant species rediscovered in Zion National Park, 2008–2011. Clockwise from top left: Catnip (*Nepeta cataria*), rediscovered and photographed by Derrick Zobell in 2010. Arizona pincushion (*Coryphantha vivipara* var. *arizonica*) from the vicinity of Crater Hill in Zion National Park, relocated in flower and photographed by Cheryl Decker in 2010. Chicory (*Cichorium intybus*), reported but not confirmed until photographed by Derrick Zobell in 2010. Rock holly-fern (*Polystichum scopulinum*), formerly considered historical and relocated and photographed by Steve McKee in 2007. Fruiting capsules with remnant flowers of Lindley's white bog-orchid (*Habenaria dilatata* var. *leucostachys*), rediscovered by Steve McKee in 2011. Red-osier dogwood (*Cornus sericea*), considered historical until relocated in 2011 by Derrick Zobell.

**Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Amaranthaceae	<i>Amaranthus retroflexus</i>	redroot pigweed	AnnF	Intro	Pres	Unc	Fertig 25219 ZION (2009). Previously on potential list. Native to Central America.
Apocynaceae	<i>Vinca major</i>	grave-myrtle	PerF	Intro	Pres	Unc	Derrick Zobell photo (2010); Fertig 26364 ZION (2011). Native to Europe.
*Asclepiadaceae	<i>Asclepias erosa</i>	desert milkweed	PerF	Periph	Pres	Rare	Fertig 24650 ZION (2009).
*Boraginaceae	<i>Cryptantha circumcissa</i>	cushion cryptanth	AnnF	Wide	Pres	Unc	Meszaros 107 ZION (2009). Previously on potential list.
Boraginaceae	<i>Cryptantha recurvata</i>	recurved cryptanth	AnnF	Wide	Pres	Rare	Fertig 26445 ZION (2011). Previously on potential list.
Cactaceae	<i>Opuntia polyacantha</i> var. <i>polyacantha</i>	Plains prickly-pear	PerF	Wide	Rep	Unk	Cogan and others (2004, p. A-228) and Ott (2010). Previously on potential list.
Cannabaceae	<i>Cannabis sativa</i>	hemp, marijuana	PerF	Intro	Ext	Unk	Observed by Zion Resource Management staff (2005); population destroyed. Native to Eurasia.
*Caryophyllaceae	<i>Holosteum umbellatum</i>	holosteum	AnnF	Intro	Pres	Rare	Fertig 24566 ZION (2009). Native to Europe.
*Chenopodiaceae	<i>Bassia prostrata</i> ( <i>Kochia prostrata</i> )	forage kochia	Shrub	Intro	Pres	Unc	Meszaros 191 ZION (2009). Native to Eurasia.
*Chenopodiaceae	<i>Bassia scoparia</i> ( <i>Kochia scoparia</i> , <i>B. sieversiana</i> )	summer-cypress	AnnF	Intro	Pres	Unc	Fertig et al. 23277 ZION (2007). Native to Eurasia.
Chenopodiaceae	<i>Chenopodium atrovirens</i> ( <i>C. fremontii</i> var. <i>atrovirens</i> )	mountain goosefoot	AnnF	Wide	Pres	Rare	Fertig 26047b ZION (2010).
*Chenopodiaceae	<i>Corispermum americanum</i> (Includes vars. <i>americanum</i> & <i>rydbergii</i> )	American bugseed	AnnF	Wide	Pres	Unc	Fertig 25520 ZION (2009). Previously on potential list.
Chenopodiaceae	<i>Grayia spinosa</i> ( <i>Atriplex spinosa</i> , <i>A. grayi</i> )	spiny hopsage	Shrub	Wide	Rep	Unk	Cogan and others (2004, p. A-228) and Ott (2010).
*Chenopodiaceae (Sarcobataceae)	<i>Sarcobatus vermiculatus</i>	greasewood	Shrub	Wide	Pres	Unc	Fertig, Kingsley, & Gaienne 24608 ZION (2009).
*Compositae (Asteraceae)	<i>Acourtia wrightii</i> ( <i>Perezia wrightii</i> )	Wright's perezia	PerF	Periph	Pres	Unc	Meszaros 048 ZION (2009). Previously on potential list.
Compositae (Asteraceae)	<i>Ambrosia psilostachya</i> ( <i>A. coronopifolia</i> )	western ragweed	PerF	Wide	Pres	Unc	Black & Hardy s.n. Zion RM herbarium (2010). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Antennaria rosulata</i>	Breaks pussytoes	PerF	Wide	Rep	Unk	Ott (2010).



Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Compositae (Asteraceae)	<i>Artemisia frigida</i>	fringed sagebrush	Shrub	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Compositae (Asteraceae)	<i>Aster spathulatus</i> ( <i>A. occidentalis</i> , <i>Symphotrichum spathulatum</i> )	western aster	Perf	Wide	Rep	Unk	Ott (2010). Previously on potential list.
*Compositae (Asteraceae)	<i>Baileya pleniradiata</i>	woolly desert-marigold	AnnF	Wide	Pres	Unc	Carvella s.n. ZION (2007). Previously on falsely reported list.
Compositae (Asteraceae)	<i>Brickellia oblongifolia</i> var. <i>linifolia</i>	Mohave brickell-bush	Shrub	Wide	Pres	Unc	Fertig 26073 ZION (2010) and Ott (2010). Previously on potential list.
Compositae (Asteraceae)	<i>Chryopsis fulcrata</i> ( <i>Heterotheca fulcrata</i> . Included in <i>C. villosa</i> by Welsh and others (2008))	rocky scree golden-aster	Perf	Periph	Pres	Unc	Fertig 25994 ZION (2010).
Compositae (Asteraceae)	<i>Chrysothamnus Greenei</i>	Greene's rabbitbrush	Shrub	Wide	Rep	Unk	Ott (2010), confirmation needed.
Compositae (Asteraceae)	<i>Crepis acuminata</i>	mountain hawkbeard	Perf	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Compositae (Asteraceae)	<i>Crepis runcinata</i>	meadow hawkbeard	Perf	Wide	Rep	Unk	Ott (2010). Variety not indicated, but probably var. <i>glauca</i> or <i>runcinata</i> .
*Compositae (Asteraceae)	<i>Filago californica</i> ( <i>Logfia californica</i> , L. <i>filaginoides</i> )	fluffweed	AnnF	Periph	Pres	Unc	Meszaros 034 ZION (2009).
Compositae (Asteraceae)	<i>Gaillardia pulchella</i>	firewheel	AnnF	Intro	Pres	Unc	Zobell photo (2010). Native to S USA, introduced in UT.
*Compositae (Asteraceae)	<i>Haplopappus armerioides</i> var. <i>armerioides</i> ( <i>Stenotus armerioides</i> var. <i>armerioides</i> )	thrift goldenweed	Perf	Wide	Pres	Unc	Fertig 24585 ZION (2009).
Compositae (Asteraceae)	<i>Haplopappus spinulosus</i> var. <i>gooddingii</i> ( <i>Xanthisma spinulosum</i> var. <i>gooddingii</i> , <i>Machaeranthera spinulosa</i> var. <i>gooddingii</i> )	spiny goldenweed	Perf	Periph	Pres	Unc	Zobell photo (2010), Fig. 3-4. Previously on potential list.

**Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011, cont.**

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Compositae (Asteraceae)	<i>Helianthus anomalus</i> (Includes <i>H. deserticola</i> )	sand sunflower	AnnF	RegEn	Rep	Unk	Ott (2010). Previously on potential list.
*Compositae (Asteraceae)	<i>Helianthus nuttallii</i>	Nuttall's sunflower	PerF	Wide	Pres	Rare	Fertig, Fertig, & Decker 23273 ZION (2007). Previously on potential list.
Compositae (Asteraceae)	<i>Hieracium fendleri</i> ( <i>Chlorocrepis fendleri</i> )	Fendler's hawkweed	PerF	Periph	Rep	Unk	Ott (2010). Previously on potential list.
*Compositae (Asteraceae)	<i>Machaeranthera canescens</i> var. <i>canescens</i> ( <i>Aster canescens</i> , <i>Dieteria canescens</i> var. <i>canescens</i> )	hoary aster	PerF	Wide	Pres	Unc	Fertig 25278 ZION (2009).
Compositae (Asteraceae)	<i>Senecio hydrophilus</i>	water groundsel	PerF	Wide	Rep	Unk	Ott (2010).
*Compositae (Asteraceae)	<i>Sonchus oleraceus</i>	common sow-thistle	AnnF	Intro	Pres	Unc	Carvella s.n. ZION (2007). Native to Europe.
Convolvulaceae (Cuscutaceae)	<i>Cuscuta indecora</i> ( <i>C. indecora</i> var. <i>neuropetala</i> , <i>Grammica indecora</i> )	large-seed dodder	AnnF	Wide	Pres	Rare	Fertig et al. 26315 ZION (2010)
*Cruciferae (Brassicaceae)	<i>Alyssum desertorum</i>	desert madwort	AnnF	Intro	Pres	Unc	Fertig 24465 ZION (2009). Native to Europe.
*Cruciferae (Brassicaceae)	<i>Alyssum parviflorum</i> var. <i>micranthum</i> ( <i>A. minus</i> var. <i>micranthum</i> , <i>A. simplex</i> )	European madwort	AnnF	Intro	Pres	Rare	Fertig 24564 ZION (2009). Native to Eurasia.
Cruciferae (Brassicaceae)	<i>Arabis hirsuta</i> ( <i>A. pycnocarpa</i> , <i>A. eschscholtziana</i> )	hairy rockcress	PerF	Wide	Rep	Unk	Ott (2010).
Cruciferae (Brassicaceae)	<i>Cardamine cordifolia</i> var. <i>cordifolia</i>	heartleaf bittercress	PerF	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Cruciferae (Brassicaceae)	<i>Lepidium campestre</i> ( <i>Neolepia campestris</i> )	field pepperwort	AnnF	Intro	Rep	Unk	Ott (2010). Previously on potential list. Native to Asia.
Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>heterophyllum</i> ( <i>L. integrifolium</i> var. <i>heterophyllum</i> )	Cedar Canyon pepperwort	PerF	LocEn	Pres	Rare	Zobell photos from Kolob area (2010), Fig. 3-4.

Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
Cruciferae (Brassicaceae)	<i>Sisymbrium irio</i>	London mustard	AnnF	Intro	Rep	Unk	Ott (2010). Previously on potential list. Native to Europe.
*Cyperaceae	<i>Eleocharis rostellata</i>	beaked spikerush	PerG	Wide	Pres	Unc	Fertig et al. 23283 ZION (2007).
*Cyperaceae	<i>Lipocarpus aristulata</i> (L. drummondii, <i>Hemicarpha drummondii</i> , <i>H. micrantha</i> )	slender-rush	AnnG	Periph	Pres	Rare	Shorrock s.n. ZION (2004).
Equisetaceae	<i>Equisetum x nelsonii</i> (Hybrid of <i>E. laevigatum</i> x <i>E. variegatum</i> )	Nelson's scouring-rush	Fern	Wide	Pres	Rare	Fertig 26075 ZION (2010).
Geraniaceae	<i>Geranium richardsonii</i>	Richardson's crane's-bill	PerF	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Gramineae (Poaceae)	<i>Arundo donax</i>	giant reed	PerG	Intro	Pres	Unc	Zion Resource Management Staff # 272 (2010). Native to Eurasia. Previously on potential list.
*Gramineae (Poaceae)	<i>Avena fatua</i> var. <i>fatua</i> ( <i>A. fatua</i> )	wild oats	AnnG	Intro	Pres	Rare	Meszaros 141 ZION (2009). Native to Eurasia.
*Gramineae (Poaceae)	<i>Bromus trinii</i> ( <i>B. berterouanus</i> )	Chilean chess	AnnG	Intro	Pres	Unc	Meszaros 041 ZION (2009). Native to South America.
Gramineae	<i>Erioneuron pilosum</i>	hairy tridens	PerG	Wide	Rep	Unk	Ott (2010).
*Gramineae (Poaceae)	<i>Sorghum bicolor</i>	grain sorghum	PerG	Intro	Pres	Unc	Franzone s.n. ZION (2007). Native to Eurasia.
Gramineae (Poaceae)	<i>Stipa neomexicana</i> ( <i>Hesperostipa neomexicana</i> )	New Mexico feathergrass	PerG	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Gramineae (Poaceae)	<i>Stipa pinetorum</i> ( <i>Achnatherum pinetorum</i> )	pine needlegrass	PerG	Wide	Rep	Unk	Ott (2010).
*Hydrophyllaceae	<i>Eucrypta micrantha</i>	desert eucrypta	AnnF	Periph	Pres	Unc	Meszaros 052 ZION (2009). Previously on potential list.
*Hydrophyllaceae	<i>Phacelia affinis</i>	twin phacelia	AnnF	Periph	Pres	Rare	Meszaros s.n. ZION (2009). Previously on falsely reported list.
Labiatae (Lamiaceae)	<i>Lycopus americanus</i>	cut-leaf horehound	PerF	Wide	Pres	Unc	Lund KL0906201002 ZION (2010). Confirmation needed.
Labiatae (Lamiaceae)	<i>Origanum vulgare</i>	oregano	PerF	Intro	Pres	Unc	Decker observation at Zion housing area (2011). Native to Mediterranean.
Labiatae (Lamiaceae)	<i>Rosmarinus officinalis</i>	rosemary	Shrub	Intro	Pres	Unc	Decker observation at Zion housing area (2011). Native to Europe.

Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Leguminosae (Fabaceae)	<i>Astragalus convallarius</i> var. <i>finitimus</i>	Enterprise milkvetch	PerF	RegEn	Pres	Rare	McDaniel FX-138 ZION Resource Mgmt Herbarium (2001); Fertig et al. 26358 ZION (2011). Previously on falsely reported list.
Liliaceae (Alliaceae)	<i>Allium schoenoprasum</i>	chives	PerF	Intro	Pres Obs.	Unc	Decker observation at Zion housing area (2011). Cultivated forms native to Eurasia.
Liliaceae	<i>Leucocrinum montanum</i>	star-lily	PerF	Periph	Rep	Unk	Ott (2010).
Malvaceae	<i>Hibiscus trionum</i>	flower-of-an-hour	AnnF	Intro	Pres	Unc	Black & Hardy s.n. Zion RM herbarium (2010). Native to Africa.
Nyctaginaceae	<i>Mirabilis pumila</i> (M. <i>albida</i> )	Standley's four-o'clock	PerF	Wide	Rep	Unk	Ott (2010). Previously on potential list.
*Onagraceae	<i>Camissonia brevipes</i>	showy camissonia	AnnF	Periph	Pres	Unc	Meszaros 096 ZION (2009).
Onagraceae	<i>Epilobium glandulosum</i> (E. <i>ciliatum</i> var. <i>glandulosum</i> )	glandular willowherb	PerF	Wide	Rep	Unk	Ott (2010). Could be mistaken for E. <i>ciliatum</i> .
Orobanchaceae	<i>Orobanche uniflora</i> (O. <i>uniflora</i> var. <i>occidentalis</i> , <i>Aphyllonuniflorum</i> )	naked broomrape	PerF	Sparse	Rep	Unk	Ott (2010). Previously on potential list.
Polemoniaceae	<i>Collomia linearis</i>	small collomia	AnnF	Wide	Rep	Unk	Ott (2010). Previously on potential list.
Polemoniaceae	<i>Gilia scopulorum</i>	rock gilia	AnnF	Periph	Rep	Unk	Ott (2010). Previously on falsely reported list.
*Polygonaceae	<i>Eriogonum cernuum</i> var. <i>psammophilum</i> (Var. not recognized in Flora of North America; FNA)	sand dune nodding wild buckwheat	AnnF	LocEn	Pres	Rare	Fertig 25222 ZION (2009).
*Polygonaceae	<i>Eriogonum inflatum</i> var. <i>fusiforme</i> (E. <i>fusiforme</i> )	Grand Valley desert trumpet	AnnF	RegEn	Pres	Unc	Fertig 24641 ZION (2009).
Pyrolaceae (Ericaceae)	<i>Chimaphila umbellata</i> var. <i>occidentalis</i> (C. <i>umbellata</i> ssp. <i>umbellata</i> )	pipissewa	PerF	Wide	Rep	Unk	Ott (2010).
Rosaceae	<i>Potentilla arguta</i> var. <i>convallaria</i> ( <i>Drymocallos arguta</i> )	tall cinquefoil	PerF	Wide	Pres	Unc	Zobell photo (2011), Fig. 3-4. Previously on potential list.

Table 3-46. New vascular plant taxa confirmed or reported for Zion National Park, 2008–2011, cont.

Family	Species (Synonyms)	Common name	Life form	Range	Status	Pop size	Source (year)/Comments
*Rosaceae	<i>Rubus discolor</i> ( <i>R. armeniacus</i> )	Himalayan blackberry	Shrub	Intro	Pres	Rare	Decker 271 ZION (2010). Reported in Fertig et al. 2010. Native to Eurasia.
*Saxifragaceae (Grossulariaceae)	<i>Ribes viscosissimum</i> var. <i>viscosissimum</i>	sticky currant	Shrub	Wide	Pres	Unc	Decker 26 ZION (2008).
Selaginellaceae	<i>Selaginella watsonii</i>	Watson's spike-moss	Fern	Wide	Rep	Unk	Ott (2010). Previously on potential list.
*Ulmaceae (Celtidaceae)	<i>Celtis occidentalis</i>	common hackberry	Tree	Intro	Pres	Rare	Collector and date not provided—specimen in ZION Resource Management Herbarium. Native to E North America.
Umbelliferae (Apiaceae)	<i>Cymopterus terebinthinus</i> var. <i>albiflorus</i> ( <i>C. terebinthinus</i> var. <i>calcareus</i> , <i>Pteryxia terebinthina</i> var. <i>albiflora</i> )	aromatic spring-parsley	Perf	Wide	Pres	Unc	Fertig & Fertig 25585 ZION (2010).
*Urticaceae	<i>Urtica dioica</i> ( <i>U. gracilis</i> )	stinging nettle	Perf	Wide	Rep	Unk	Observed by Margaret Malm at spring by Wildcat Canyon Trail. Also observed by D. Zobell (2011), but not photographed. Var. not determined.
Valerianaceae	<i>Valeriana occidentalis</i>	western valerian	Perf	Wide	Rep	Unk	Ott (2010). Previously on falsely reported list. May be based on <i>V. arizonica</i> .
Violaceae	<i>Viola adunca</i>	hook-spur violet	Perf	Wide	Pres	Rare	Fertig & Lesica 26455 ZION (2011); Zobell photo (2011). Previously on potential list.
Violaceae	<i>Viola praemorsa</i> (Included in <i>V. nuttallii</i> by some authors)	upland yellow violet	Perf	Wide	Pres	Unc	Zobell photo (2011), Fig. 3-4, from vicinity of Lava Point.
Viscaceae	<i>Arceuthobium abietinum</i>	fir dwarf-mistletoe	Perf	Periph	Rep	Unk	Ott (2010). Confirmation needed.

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-47. Changes in status for Zion National Park species, 2008–2011.**

Family	Scientific name (Synonyms)	Common name	Previous status	Current status	Pop size	Revised source (year)
Agavaceae	<i>Yucca angustissima</i> ( <i>Y. angustissima</i> var. <i>angustissima</i> )	narrow-leaved yucca	Rep	Pres	Unc	Fertig 25612 ZION (2010).
Boraginaceae	<i>Cryptantha humilis</i> ( <i>Oreocarya humilis</i> )	dwarf cryptanth	Rep	Pres	Unc	Fertig et al. 25631 ZION (2010).
Cactaceae	<i>Coryphantha vivipara</i> var. <i>arizonica</i> ( <i>Escobaria vivipara</i> var. <i>arizonica</i> . Vars. not recognized in <i>FNA</i> (2003))	Arizona pincushion	Rep	Pres	Rare	Decker photo (2010), Fig. 3-5, variety previously not confirmed (Fertig et al. 2010).
Cactaceae	<i>Echinocereus triglochidiatus</i> var. <i>mojavensis</i> (Variety not recognized in <i>FNA</i> )	Mohave claretcup	Rep	Pres	Rare	Fertig 25333 ZION (2009). Taxonomy still in flux.
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>incanum</i> ( <i>C. incanum</i> )	silvery goosefoot	Hist	Pres	Unc	Meszaros s.n. Zion RM herbarium (2009).
*Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>vaseyana</i> ( <i>Seriphidium vaseyanum</i> )	mountain big sagebrush	Rep	Pres	Unc	Fertig 25273 ZION (2009).
Compositae (Asteraceae)	<i>Cichorium intybus</i>	chicory	Rep	Pres	Unc	Zobell photo (2010), Fig. 3-5.
*Compositae (Asteraceae)	<i>Crepis occidentalis</i> var. <i>occidentalis</i> ( <i>Psilochenia occidentalis</i> )	western hawksbeard	Rep	Pres	Unc	Nielsen 725 ZION (2008).
Convolvulaceae (Cuscutaceae)	<i>Cuscuta pentagona</i>	field dodder	Hist	Pres	Unc	Black & Hardy s.n. Zion RM herbarium (2010).
Cornaceae	<i>Cornus sericea</i> ( <i>C. stolonifera</i> )	red-osier dogwood	Hist	Pres	Rare	Zobell photo (2011), Fig. 3-5.
*Cruciferae (Brassicaceae)	<i>Arabis demissa</i> ( <i>Boechea demissa</i> var. <i>languida</i> , <i>B. oxylobula</i> )	nodding rockcress	Hist	Pres	Unc	Fertig 24718 ZION (2009).
*Cruciferae (Brassicaceae)	<i>Brassica rapa</i> ( <i>B. campestris</i> , <i>B. napus</i> )	field mustard	Hist	Pres	Unc	Collector and date not provided—specimen in ZION RM Herbarium. Native to Europe. Called <i>B. campestris</i> in Fertig et al. 2010 report.
*Cruciferae (Brassicaceae)	<i>Lepidium lasiocarpum</i> var. <i>georginum</i>	St. George pepperwort	Rep	Pres	Unc	Fertig 24670 ZION (2009).
Cruciferae (Brassicaceae)	<i>Lepidium lasiocarpum</i> var. <i>lasiocarpum</i> ( <i>L. lasiocarpum</i> )	hairy-pod pepperwort	Hist	Pres	Unc	Fertig 15607 ZION (2010).
*Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>montanum</i>	mountain pepperwort	Hist	Pres	Unc	Fertig 24633 ZION (2009).

Table 3-47. Changes in status for Zion National Park species, 2010–2011, cont.

Family	Scientific name (Synonyms)	Common name	Previous status	Current status	Pop size	Revised source (year)
*Gramineae (Poaceae)	<i>Distichlis spicata</i> ( <i>D. spicata</i> var. <i>stricta</i> , <i>D. stricta</i> )	desert saltgrass	Hist	Pres	Unc	Fertig 24647 ZION (2009).
*Gramineae (Poaceae)	<i>Elymus repens</i> ( <i>Agropyron repens</i> , <i>Elytrigia repens</i> )	quackgrass	Rep	Pres	Unc	Fertig et al. 23280 ZION (2007). Native to Eurasia.
Labiatae (Lamiaceae)	<i>Nepeta cataria</i>	catnip	Hist	Pres	Unc	Zobell photo (2010), Fig. 3-5, Decker observation (2011).
*Leguminosae (Fabaceae)	<i>Lotus rigidus</i>	bush trefoil	Rep	Pres	Unc	Meszaros 112 ZION (2009).
Nyctaginaceae	<i>Allionia incarnata</i> ( <i>A. incarnata</i> var. <i>incarnata</i> )	trailing four-o'clock	Hist	Pres	Unc	Decker s.n. ZION Resource herbarium (2008); Zobell photo (2010) (see cover page)
*Onagraceae	<i>Oenothera albicaulis</i>	white-stem evening-primrose	Hist	Pres	Unc	Meszaros 122 ZION (2009)
Orchidaceae	<i>Habenaria dilatata</i> var. <i>leucostachys</i> ( <i>Platanthera dilatata</i> var. <i>leucostachys</i> , <i>P. leucostachys</i> )	Lindley's white bog-orchid	Hist	Pres	Unc	Mckee photo (2011), Fig. 3-5.
Polemoniaceae	<i>Ipomopsis aggregata</i> var. <i>macrosiphon</i> ( <i>Gilia aggregata</i> var. <i>macrosiphon</i> )	scarlet gilia	Rep (Fertig et al. 2010)	False Rep	NA	Louie s.n. Zion RM herbarium is var. <i>arizonica</i> .
Polemoniaceae	<i>Ipomopsis congesta</i> var. <i>congesta</i> ( <i>Gilia congesta</i> var. <i>congesta</i> )	ball-head gilia	Rep	Pres	Rare	Fertig 26079 ZION (2010).
*Polygonaceae	<i>Rumex salicifolius</i> ( <i>R. mexicanus</i> , <i>R. triangulivalvis</i> )	willow dock	Hist	Pres	Unc	Decker 32 ZION (2008).
*Polypodiaceae	<i>Polystichum scopulinum</i>	rock holly-fern	Hist	Pres	Unc	Steve McKee photo (2007), Fig. 3-5.
*Ranunculaceae	<i>Myosurus cupulatus</i>	horseshoe mousetail	Rep	Pres	Unc	Meszaros 058 ZION (2009)
*Rhamnaceae	<i>Ceanothus greggii</i> var. <i>vestitus</i>	Mohave desert-lilac	Rep	Pres	Unc	Fertig 25327 ZION (2009).
Scrophulariaceae	<i>Orthocarpus luteus</i>	yellow owl-clover	Hist	Pres	Unc	Bastian s.n. Zion RM herbarium (1997).
*Umbelliferae (Apiaceae)	<i>Berula erecta</i> var. <i>incisa</i>	cutleaf water-parsnip	Hist	Pres Obs.	Rare	Fertig observation, River Walk Trail (2009).

\*Indicates species cited in previous updates by Fertig and others (2009c) or (2010).

**Table 3-48. Revised statistical summary of the flora of Zion National Park.**

Category	Present or Historical in park	Reported for park	Total
<b>Taxonomic Diversity</b>			
Total taxa (including varieties and subspecies)	1,009	65	1,074
Full species (excluding varieties and subspecies)	947	64	1,011
Families	98	0	98
<b>Life Form Diversity</b>			
Tree taxa	37	3	40
Shrub taxa	127	10	137
Perennial forb taxa	462	30	492
Annual forb taxa	201	12	213
Perennial graminoid taxa	121	8	129
Annual graminoid taxa	34	1	35
Fern taxa	27	1	28
<b>Biogeographic Diversity</b>			
Introduced taxa	150	12	162
<b>Native taxa</b>			
Locally endemic taxa	44	2	46
Regionally endemic taxa	88	4	92
Disjunct taxa	4	1	5
Peripheral taxa	102	8	110
Sparse taxa	16	2	18
Widespread taxa	605	36	641
<i>Total native taxa</i>	<i>859</i>	<i>53</i>	<i>912</i>

This table updates Table 3.1 from Fertig and Alexander (2009) and Table 4 of Fertig and others (2010) and reflects new species discovered or re-located in 2009. The number of taxa and families is based on taxonomic concepts of Welsh and others (2008).



### 3.17 Summary of all 16 NCPN units

Since 2008, 432 new vascular plant species have been added to the floras of all 16 park units in the Northern Colorado Plateau Network (Table 3-49). The greatest net increase has come in the flora of Zion National Park, with 83 new plant taxa, followed by Dinosaur National Monument (57), Pipe Spring National Monument (56), and Bryce Canyon National Park and Cedar Breaks National Monument (both with 41). Over this same time period, the status of another 102 species has been changed (Table 3-49). In most cases, species that were formerly classified as

reported or historical in a park have been re-discovered and verified by a specimen, photograph, or confirmed observation (although this list also includes a small number of species shown to be falsely reported on further examination). All told, 534 changes have been made to the annotated checklists of the 16 network parks in the last four field seasons (2008–2011). In addition, recent nomenclatural changes have affected 48 Utah species represented by 159 park records (Fertig et al. 2009). In just four years, nearly 700 changes to park checklists have been necessary to keep up with new research.

**Table 3-49. Summary of changes in the floras of all Northern Colorado Plateau Network parks, 2008–2011.**

Park unit	# taxa circa 2007	# of new taxa 2008–2011	# of changes in park status 2008–2011	# taxa in 2011
Arches NP	522	30	3	551
Black Canyon of the Gunnison NP	532	11	1	543
Bryce Canyon NP	587	41	6	628
Canyonlands NP	594	33	4	627
Capitol Reef NP	887	22	1	909
Cedar Breaks NM	345	41	2	385
Colorado NM	467	1	1	468
Curecanti NRA	679	25	3	704
Dinosaur NM	756	57	3	812
Fossil Butte NM	546	8	4	554
Golden Spike NHS	144	8	1	152
Hovenweep NM	340	5	1	345
Natural Bridges NM	428	1	1	429
Pipe Spring NM	277	56	41	330
Timpanogos Cave NM	235	10	0	245
Zion NP	991	83	30	1,074
<b>TOTAL</b>	<b>n/a</b>	<b>432</b>	<b>102</b>	<b>n/a</b>



## 4 Discussion

As permanently protected lands managed with an emphasis on preserving biological diversity and ecological processes, parks, monuments, recreation areas, and historic sites managed by the National Park Service play a significant role in conserving both common and rare species (Groves et al. 2002; Margules and Sarkar 2007). Knowing the biotic composition of these lands is vital to conservation planning. Although presence in a parkland does not ensure long-term persistence, species found in park units usually have a better chance of survival than on unprotected lands. Gaps in protected-area representation can also be used to drive decisions on protecting new areas (Fertig 2010b).

Well-maintained species checklists are an important conservation tool, complementing their traditional value in assisting researchers, informing managers, and educating the public. Keeping these lists current can be a challenge, as underscored by the rapid rate of change in NCPN floras in just four years. Not surprisingly, the parks that have received the most research attention by botanists in recent years (Pipe Spring NM, Bryce Canyon NP, Zion NP, Dinosaur NM, Cedar Breaks NM) have had large increases in the size of their respective floras. Similar results likely could be achieved in parks that have received less attention, such as Colorado NM, Black Canyon of the Gunnison NP, or Natural Bridges NM.

For species lists to be effective, it is vital that field observations be reliably documented. Ideally, voucher specimens should be secured and deposited in a park or university herbarium and available for verification by experts. High-quality photographs of critical features of a species can be a substitute. Vouchers or photos need to be accompanied by detailed locality information. Observations that are not accompanied by supporting evidence are much less reliable. Numerous new reports for species from recent vegetation mapping studies had to be relegated to “questionable” status in our study because corroborating documentation was not provided. Some of these reports will invariably prove to be correct, but any report of a species that is rare or outside of its suspected range should be treated cautiously so as not to call into question the reliability of the entire park checklist.

As the data provided in this report suggest, it is wrong to assume that inventory work for the 16 park units in the Northern Colorado Plateau Network is completed. New reports will continue to come to light from park employees, researchers, and amateur naturalists. Additional data sources, such as regional university or public herbaria, have not been completely mined for new species records. Revisions of nomenclature and taxonomic relationships will also continue. All of these changes underscore the importance of continued database management within the network. Results from the past four years also demonstrates that inventory is still a key component of the NPS Natural Resource Inventory and Monitoring program.



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# Appendix A. Nomenclatural Changes from the Fourth Edition of *A Utah Flora* (Welsh et al. 2008)

The annotated checklists (see entries in Chapter 5) for the 11 Utah parks in this report were developed using the nomenclature of the third edition of *A Utah Flora* (Welsh et al. 2003). Shortly before the National Park Service published the checklists, a revised version of the *Utah Flora* was published (Welsh et al. 2008). This new edition introduced a number of changes in nomenclature and species concepts. These changes are summarized in the following table, reprinted from Fertig and others (2009c).

## Key

Family and species nomenclature follows Welsh and others (2008).

### Park codes:

ARCH = Arches NP

BRCA = Bryce Canyon NP

CANY = Canyonlands NP

CARE = Capitol Reef National Park

CEBR = Cedar Breaks National Monument

DINO = Dinosaur National Monument

GOSP = Golden Spike National Historic Site

HOVE = Hovenweep National Monument

NABR = Natural Bridges National Monument

TICA = Timpanogos Cave National Monument

ZION = Zion National Park

### Park status:

H = Historical (not relocated since 1970),

Po = Potential (species has not been found in park yet, but is known from similar habitats in vicinity),

Pr = Present (confirmed with a voucher),

R = Reported (cited for park in literature or based on a reliable observation, but without a voucher),

F = False Report (previous report has been shown to be incorrect or is questionable).

**Table A-1. Nomenclatural changes for the fourth edition of A Utah Flora.**

Family	Former species name (Welsh et al. 2003)	Current species name (Welsh et al. 2008)	Park status									Comments			
			ARCH	BRCA	CANY	CARE	CEBR	DINO	GOSP	HOVE	NABR		TICA	ZION	
Agavaceae	<i>Yucca harrimaniae</i> var. <i>sterilis</i>	<i>Yucca sterilis</i>						Po							Var. <i>sterilis</i> recognized as a full species.
Capparaceae (Cleomaceae)	<i>Cleomella palmeriana</i> var. <i>goodrichii</i>	<i>Cleomella hillmanii</i> var. <i>goodrichii</i>						R							Var. <i>goodrichii</i> transferred to <i>C. hillmanii</i> .
Caryophyllaceae	<i>Cerastium arvense</i>	<i>Cerastium arvense</i> var. <i>strictum</i>		Po		Po						Po			Variety name added in Welsh and others (2008).
Caryophyllaceae	<i>Silene scouleri</i> ssp. <i>pringlei</i>	<i>Silene scouleri</i> ssp. <i>hallii</i>				Po								Pr	UT material now considered to be ssp. <i>hallii</i> .
Caryophyllaceae	<i>Spergularia marina</i>	<i>Spergularia salina</i>												Po	Name change.
Chenopodiaceae	<i>Chenopodium album</i> var. <i>album</i>	<i>Chenopodium album</i>	Pr	R	Pr	Pr	Pr	Po					R		<i>Chenopodium album</i> split into two species.
Chenopodiaceae	<i>Chenopodium album</i> var. <i>berlandieri</i>	<i>Chenopodium berlandieri</i> var. <i>zscheckei</i>	Pr		Po	Pr		Po		Po					<i>Chenopodium album</i> split into two species.
Chenopodiaceae	<i>Salicornia europaea</i> ssp. <i>rubra</i>	<i>Salicornia rubra</i>								Po					Var. <i>rubra</i> elevated to full species.
Chenopodiaceae	<i>Suaeda torreyana</i> var. <i>torreyana</i>	<i>Suaeda nigra</i> var. <i>nigra</i>	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Po	Po	Pr	Po		<i>S. torreyana</i> made a synonym of <i>S. nigra</i> .
Compositae (Asteraceae)	<i>Aster kingii</i> (no variety)	<i>Aster kingii</i> var. <i>kingii</i>					F						Pr		Variety name added in Welsh and others (2008).
Compositae (Asteraceae)	<i>Baccharis glutinosa</i>	<i>Baccharis salicifolia</i>			Po	F								Pr	<i>Baccharis glutinosa</i> made a synonym of <i>B. salicifolia</i> .
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>consimilis</i>	<i>Chrysothamnus nauseosus</i> var. <i>oreophilus</i>	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Po	Po	Po	Po	Pr	Var. <i>consimilis</i> made a synonym of var. <i>oreophilus</i> .
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>gnaphalodes</i>	<i>Chrysothamnus nauseosus</i> var. <i>hololeucus</i>	Pr	Pr	Pr	Pr		Po		Po	Pr	Pr	Pr		Var. <i>gnaphalodes</i> made a synonym of var. <i>hololeucus</i> .
Compositae (Asteraceae)	<i>Erigeron awapensis</i>	<i>Erigeron abajoensis</i>		Pr		Pr									<i>E. awapensis</i> made a synonym of <i>E. abajoensis</i> .
Compositae (Asteraceae)	<i>Erigeron glabellus</i> (without variety)	<i>Erigeron glabellus</i> var. <i>glabellus</i>					F	Pr							Variety name added in Welsh and others (2008).
Compositae (Asteraceae)	<i>Erigeron vagus</i> (without variety)	<i>Erigeron vagus</i> var. <i>madsenii</i>		Pr			Pr								New variety name published by Welsh and others (2008).

Table A-1. Nomenclatural changes for the fourth edition of A Utah Flora, cont.

Family	Former species name (Welsh et al. 2003)	Current species name (Welsh et al. 2008)	Park status									Comments		
			ARCH	BRCA	CANY	CARE	CEBR	DINO	GOSP	HOVE	NABR		TICA	ZION
Compositae (Asteraceae)	<i>Gnaphalium wrightii</i>	<i>Gnaphalium canescens</i>			Pr								Pr	<i>Gnaphalium wrightii</i> made a synonym of <i>G. canescens</i> .
Compositae (Asteraceae)	<i>Ambrosia salsola</i>	<i>Hymenoclea salsola</i>											Pr	<i>Ambrosia salsola</i> made a synonym of <i>Hymenoclea s.</i>
Compositae (Asteraceae)	<i>Helenium hoopesii</i>	<i>Hymenoxys hoopesii</i>	Po			Po	Pr							<i>Helenium hoopesii</i> made a synonym of <i>Hymenoxys h.</i>
Compositae (Asteraceae)	<i>Senecio douglasii</i> var. <i>longilobus</i>	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	R	Po	R	Pr					Pr	Po	Pr	<i>S. douglasii</i> made a synonym of <i>S. flaccidus</i> .
Compositae (Asteraceae)	<i>Senecio douglasii</i> var. <i>monoensis</i>	<i>Senecio flaccidus</i> var. <i>monoensis</i>											Po	<i>S. douglasii</i> made a synonym of <i>S. flaccidus</i> .
Compositae (Asteraceae)	<i>Xylorhiza tortifolia</i> var. <i>imberbis</i>	<i>Xylorhiza imberbis</i>	Pr		Pr	Pr				Po	Po			Var. <i>imberbis</i> elevated to full species.
Cruciferae (Brassicaceae)	<i>Alyssum minus</i> var. <i>micranthum</i>	<i>Alyssum parviflorum</i> var. <i>micranthum</i>				Pr		Pr						<i>Alyssum minus</i> made a synonym of <i>A. parviflorum</i> .
Cruciferae (Brassicaceae)	<i>Arabis pulchra</i> var. <i>munciensis</i>	<i>Arabis pulchra</i> var. <i>gracilis</i>											Pr	Var. <i>munciensis</i> made a synonym of var. <i>gracilis</i> .
Cruciferae (Brassicaceae)	<i>Brassica campestris</i>	<i>Brassica rapa</i>										Pr	H	<i>Brassica campestris</i> made a synonym of <i>B. rapa</i> .
Cruciferae (Brassicaceae)	<i>Descurainia incana</i> var. <i>sonnei</i>	<i>Descurainia incana</i> var. <i>incana</i>	Pr	R		R	Pr	Pr					Pr	Var. <i>sonnei</i> made a synonym of var. <i>incana</i> .
Cruciferae (Brassicaceae)	<i>Physaria wardii</i>	<i>Physaria kingii</i> var. <i>parvifolia</i>		Pr		Pr	Pr						Pr	<i>Physaria wardii</i> made a synonym of <i>P. kingii</i> .
Cruciferae (Brassicaceae)	<i>Rorippa islandica</i> var. <i>glabra</i>	<i>Rorippa palustris</i> var. <i>glabra</i>				R	Pr	Pr						<i>Rorippa islandica</i> made a synonym of <i>R. palustris</i> .
Cruciferae (Brassicaceae)	<i>Rorippa islandica</i> var. <i>hispidula</i>	<i>Rorippa palustris</i> var. <i>hispidula</i>							Pr		R			<i>Rorippa islandica</i> made a synonym of <i>R. palustris</i> .
Cyperaceae	<i>Carex gynocrates</i>	<i>Carex dioica</i> var. <i>gynocrates</i>		Po				Pr						<i>Carex gynocrates</i> made a variety of <i>C. dioica</i> .
Elatinaceae	<i>Elatine triandra</i>	<i>Elatine rubella</i>							Po					<i>Elatine triandra</i> made a synonym of <i>E. rubella</i> .
Guttiferae (Hypericaceae)	<i>Hypericum formosum</i> var. <i>scouleri</i>	<i>Hypericum scouleri</i>											Pr	Var. <i>scouleri</i> elevated to full species.

Table A-1. Nomenclatural changes for the fourth edition of A Utah Flora, cont.

Family	Former species name (Welsh et al. 2003)	Current species name (Welsh et al. 2008)	Park status									Comments			
			ARCH	BRCA	CANY	CARE	CEBR	DINO	GOSP	HOVE	NABR		TICA	ZION	
Leguminosae (Fabaceae)	<i>Dalea oligophylla</i>	<i>Dalea occidentalis</i>	Pr		Pr					Po	Pr				<i>Dalea oligophylla</i> made a synonym of <i>D. occidentalis</i> .
Leguminosae (Fabaceae)	<i>Lupinus latifolius</i> var. <i>columbianus</i>	<i>Lupinus latifolius</i> var. <i>leucanthus</i>											Pr		Var. <i>columbianus</i> made a synonym of var. <i>leucanthus</i> .
Nyctaginaceae	<i>Abronia fragrans</i> (without variety)	<i>Abronia fragrans</i> var. <i>fragrans</i>	Pr	Pr	Pr	Pr				Pr	Pr				Two varieties recognized in Welsh and others (2008).
Onagraceae	<i>Camissonia walkeri</i> (without variety)	<i>Camissonia walkeri</i> var. <i>tortilis</i>												H	Zion material belongs to new variety <i>tortilis</i> .
Onagraceae	<i>Camissonia walkeri</i> (without variety)	<i>Camissonia walkeri</i> var. <i>walkeri</i>	Po	Pr	Pr	Pr				Po					Two varieties recognized in Welsh and others (2008).
Onagraceae	<i>Oenothera californica</i> (without variety)	<i>Oenothera californica</i> var. <i>avita</i>												H	New variety named by Welsh and others (2008).
Polypodiaceae (Adiantaceae or Sinopteridaceae)	<i>Pellaea glabella</i> var. <i>occidentalis</i>	<i>Pellaea glabella</i> ssp. <i>simplex</i>	Pr	Pr	Pr					Pr			Pr		Var. <i>occidentalis</i> made a synonym of ssp. <i>simplex</i> .
Potamogetonaceae	<i>Potamogeton nodosus</i>	<i>Potamogeton fluitans</i>								Pr					<i>Potamogeton nodosus</i> made a synonym of <i>P. fluitans</i> .
Primulaceae	<i>Samolus floribundus</i>	<i>Samolus valerandi</i>												Pr	<i>Samolus floribundus</i> made a synonym of <i>S. valerandi</i> .
Ranunculaceae	<i>Delphinium andersonii</i> var. <i>andersonii</i>	<i>Delphinium scaposum</i> var. <i>andersonii</i>													<i>Delphinium scaposum</i> is the earliest name for the species.
Ranunculaceae	<i>Delphinium andersonii</i> var. <i>scaposum</i>	<i>Delphinium scaposum</i> var. <i>scaposum</i>	Pr	Pr	Pr						R		Pr		<i>Delphinium scaposum</i> is the earliest name for the species.
Umbelliferae (Apiaceae)	<i>Aletes macdougallii</i> ssp. <i>breviradiatus</i>	<i>Cymopterus macdougallii</i>			Po						Pr				<i>Aletes</i> made a synonym of <i>Cymopterus</i> .
Umbelliferae (Apiaceae)	<i>Oreoxis alpina</i>	<i>Cymopterus alpinus</i>												Po	<i>Oreoxis</i> made a synonym of <i>Cymopterus</i> .
Umbelliferae (Apiaceae)	<i>Oreoxis trotteri</i>	<i>Cymopterus trotteri</i>	F		Po						F				<i>Oreoxis</i> made a synonym of <i>Cymopterus</i> .
Umbelliferae (Apiaceae)	<i>Pastinaca sativa</i> (without ssp.)	<i>Pastinaca sativa</i> ssp. <i>sylvestris</i>											Po		Subspecies recognized in Welsh and others (2008).
Urticaceae	<i>Parietaria pennsylvanica</i> (without var.)	<i>Parietaria pennsylvanica</i> var. <i>pennsylvanica</i>												Pr	Varieties recognized in Welsh and others (2008).

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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**National Park Service**  
**U.S. Department of the Interior**



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