



Annotated Checklist of Vascular Flora

Pipe Spring National Monument

Natural Resource Technical Report NPS/NCPN/NRTR-2008/131



ON THE COVER

Wetland below West Cabin, Pipe Spring National Monument, Arizona. Photo by Walter Fertig.

Annotated Checklist of Vascular Flora

Pipe Spring National Monument

Natural Resource Technical Report NPS/NCPN/NRTR-2008/131

Authors

Walter Fertig
Moenave Botanical Consulting
1117 W. Grand Canyon Dr.
Kanab, UT 84741

Jason Alexander
Curator, UVU Herbarium
Utah Valley University
800 West University Parkway
Orem, UT 84058

Editing and Design

Alice Wondrak Biel
Northern Colorado Plateau Network
P.O. Box 848
Moab, UT 84532

October 2008

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

The Natural Resource Publication series addresses natural resource topics that are of interest and applicability to a broad readership in the National Park Service and to others in the management of natural resources, including the scientific community, the public, and the NPS conservation and environmental constituencies. Manuscripts are peer-reviewed to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and is designed and published in a professional manner.

The Natural Resource Technical Report series is used to disseminate the peer-reviewed results of scientific studies in the physical, biological, and social sciences for both the advancement of science and the achievement of the National Park Service's mission. The reports provide contributors with a forum for displaying comprehensive data that are often deleted from journals because of page limitations. Current examples of such reports include the results of research that addresses natural resource management issues; natural resource inventory and monitoring activities; resource assessment reports; scientific literature reviews; and peer-reviewed proceedings of technical workshops, conferences, or symposia.

Views, statements, findings, conclusions, recommendations, and data in this report are solely those of the author(s) and do not necessarily reflect views and policies of the U.S. Department of the Interior, National Park Service. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Printed copies of reports in this series may be produced in limited quantity, and are only available as long as the supply lasts. You may send a request to:

Northern Colorado Plateau Network
P.O. Box 848
Moab, UT 84532

This report is also available electronically from the Northern Colorado Plateau Network website, <http://science.nature.nps.gov/im/units/NCPN/>, or at <http://www.nature.nps.gov/publications/NRPM>.

When original printed copies are exhausted, copies can be obtained from:

Technical Information Center (TIC)
Denver Service Center
National Park Service
P.O. Box 25287
Denver, CO 80225-0287

Please cite this publication as:

Fertig, W., and J. Alexander. 2008. Annotated checklist of vascular flora: Pipe Spring National Monument. Natural Resource Technical Report NPS/NCPN/NRTR-2008/131. National Park Service, Fort Collins, Colorado.

Contents

Figures	v
Tables	vii
Abstract	ix
Acknowledgements	xi
1 Introduction	1
1.1 Background and justification.....	1
1.2 Objectives.....	1
1.3 Study area	1
1.3.1 History and setting.....	1
1.3.2 Geology	2
1.3.3 Vegetation.....	2
1.3.4 Previous botanical studies	4
2 Methods.....	7
3 Results.....	9
3.1 Summary of the flora of Pipe Spring National Monument	9
3.2 Life form and biogeographic diversity.....	10
3.3 Plants of special concern	10
3.4 Noxious weeds.....	11
4 Discussion	13
5 Literature Cited	15
6 Appendices	17
Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes..	20
Appendix B. Potential (unconfirmed) taxa of Pipe Spring National Monument	44
Appendix C. Rejected (falsely reported or questionable) taxa of Pipe Spring National Monument	47
Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes.	48

Figures

Figure 1.3.1. Location of Pipe Spring National Monument, Mohave County, Arizona. Map created by Aneth Wight of NCPN (derived from Evenden et al. 2002)..... 3

Figure 1.3.4. Increase in the number of plant taxa confirmed as present in Pipe Spring National Monument by decade, 1930–2008. 6

Tables

Table 1.3.4. Chronology of plant-collecting efforts in Pipe Spring National Monument.	5
Table 3.1. Statistical summary of the flora of Pipe Spring National Monument.	9
Table 3.3. Plant species of conservation concern from Pipe Spring National Monument.	11

Abstract

In 2005–2006, the National Park Service’s Northern Colorado Plateau Network received funding to develop a revised checklist of the vascular plant flora of Pipe Spring National Monument. This entailed a thorough review of existing literature, re-examination of specimens from the Pipe Spring National Monument herbarium and other state and national museum collections, and additional field work to corroborate unverified species reports or locate new species. Based on this study, 277 vascular plant taxa have been confirmed or reliably reported as occurring in the monument (215 are known from validated herbarium specimens and 62 from unvouchered literature reports). Another 15 species formerly considered part of the monument flora have now been shown to be falsely reported. The current flora of Pipe Spring National Monument represents 6.5% of the known flora of Arizona and 11% of the flora of northern Arizona and the Arizona Strip. Although no federally listed threatened or endangered species are known from the monument, two occur in the vicinity. Three plant species from Pipe Spring National Monument are currently tracked as species of concern by the State of Arizona’s Natural Heritage Program. Introduced plants make up nearly 21% of the monument flora (58 species), of which only 4 species are considered noxious weeds by the State of Arizona. Further surveys in Pipe Spring National Monument are likely to find additional new species (46 are known from similar habitats outside the monument boundary), especially among late-season flowering, weedy, or wetland taxa.

Acknowledgements

We would like to thank the following individuals for their assistance with this project. Botanist Dr. Angela Evenden, former leader of the Northern Colorado Plateau Network in Moab, Utah, was an active proponent of this project and helped secure funding for field work and herbarium studies in 2006. John Hiscock and Andrea Bornemeier provided data from monument archives and assisted with research permits. Cheryl Decker and Denise Louie, of Zion National Park, assisted with field surveys of the monument in 2001. Heather Karnes and An Glorieux helped with field work and data entry in 2004 and 2005, respectively. Libby Nance, database specialist with the NCPN, assisted with development and quality control of the monument's NPSpecies database. Libby Nance, Janet Coles, and Helen Thomas also provided data from recent vegetation mapping and wetland inventories on the monument. Drs. Stanley Welsh and Duane Atwood provided access to herbarium collections at Brigham Young University. Dr. Michael Piep provided access to collections at the Utah State University (Intermountain) herbarium. Dr. Ron Hartman and Ernie Nelson provided access and specimen loans from the Rocky Mountain Herbarium at the University of Wyoming. Thanks to the technical reviewers (Angela Evenden, Dr. Dusty Perkins, and Libby Nance) for their comments and suggestions. To any others whom we may have inadvertently forgotten, please accept our apologies (and thanks).

Research was conducted under permit # PISP-2006-SCI-0002 for study number PISP-00005. Funding was provided by the National Park Service through an agreement with the Rocky Mountains Cooperative Ecosystem Studies Unit and the University of Wyoming.

1 Introduction

In 2006, the National Park Service (NPS) established a cooperative agreement with the University of Wyoming, through the Rocky Mountains Cooperative Ecosystem Studies Unit, to produce a series of technical reports summarizing the vascular plant flora of each of the 16 national park units of the Northern Colorado Plateau Network (NCPN). These reports are based on existing information in the park service's NPSpecies database system and augmented by further data mining, reviews of state and regional herbaria, and new field surveys to resolve the status of many reported and unconfirmed species. The objective of these reports is to summarize the current state of knowledge of the flora of each park for the benefit of NPS biologists and interpretive staff, outside researchers, and the general public. The following report addresses the vascular flora of Pipe Spring National Monument, in northern Arizona. Other NCPN park units are addressed in separate reports.

1.1 Background and justification

One of the primary missions of NPS is "to conserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment of this and future generations" (NPS 2000). Due to their high degree of protection and distribution across a wide variety of habitat types, the nation's national park units make a significant contribution to the protection of biological diversity (Noss and Cooperrider 1994). Unfortunately, the full contribution of the NPS system is not known, as many park units have traditionally lacked comprehensive biological inventories or monitoring programs to identify the composition and condition of their biota. Knowing the status of park flora and fauna is critical for effective park management and for systematically identifying and filling gaps in the nation's protected area network (Margules and Pressey 2000).

To rectify this shortcoming, Congress passed the National Parks Omnibus Management Act in 1998 to provide guidance and funding for an inventory and monitoring program across the entire National Park System. Since 2000, the NCPN Inventory and Monitoring Program has been developing and verifying species lists of vertebrates and vascular plants for each park unit in the network

(Evenden et al. 2002). This effort has entailed reviewing existing species checklists, corroborating the identification of specimens in park museum and herbarium collections, locating additional specimen records from other museums, mining relevant literature and datasets, and conducting field surveys to locate new taxa¹ or confirm unsubstantiated reports. All of these data have been synthesized in NPSpecies, the park service's standardized database for documenting park status (present, probably present, unconfirmed, falsely reported), abundance, residency, nativity, and rarity. With the production of a technical series of reports on the flora of each park, the NPSpecies data will now be available to a broader audience.

1.2 Objectives

The objectives of this project are to:

1. Document the current status (present, reported, potential, or falsely reported) of all vascular plant species that have been cited as occurring in Pipe Spring National Monument based on a review of herbarium collections and past literature; and
2. Develop an annotated checklist of the flora of Pipe Spring National Monument with supplemental information on taxonomic synonyms, distribution, within-park abundance, flowering period, growth form, nativity, habitat, and sources for each record.

1.3 Study area

1.3.1 History and setting

As one of the few reliable water sources in a large desert area, Pipe Spring has been a focal area of human activity for many centuries. Prior to about 300 B.C., the Arizona Strip was inhabited by semi-nomadic hunter-gatherers who left little physical evidence behind. Over the next thousand years, the region was inhabited by Ancestral Puebloan peoples who engaged in agriculture and hunting and produced abundant artifacts, including pit-house sites, woven baskets, pottery sherds, and arrowheads. Prolonged drought was one likely factor that brought an end to the Puebloan culture in the local area by 1250 A.D. Subsequent inhabitants of the Arizona Strip were semi-nomadic Southern Paiute bands; the Kaibab Paiute occupied the area at the time of contact with

¹Taxa refer to all named species, subspecies, and varieties.

European cultures (McKoy 2000, Leach 1999).

Mormon missionary Jacob Hamblin passed through Pipe Spring in 1858; five years later, St. George, Utah, resident James Whitmore established a cattle ranch there. In January 1866, Whitmore was murdered during a trip to retrieve livestock driven off by an Indian party (Leach 1999, McKoy 2000). The Church of Jesus Christ of Latter-Day Saints acquired the property in 1870, constructed a fort (Winsor Castle) that controlled the outlet of Pipe Spring, and managed the site as a tithing ranch. During the 1870s, the native desert grasslands were subjected to grazing by more than 2,500 head of cattle and 11,000 sheep (Alexander 1998a). The ranch passed into private ownership in 1895, and remained as such with the establishment of the Kaibab Paiute Indian Reservation in 1909 (McKoy 2000).

While traveling to Zion National Park in 1920, National Park Service Director Stephen Mather hatched the idea of preserving the site as a national monument. With the support of local boosters anticipating improved road access and tourism income, President Warren Harding established Pipe Spring National Monument in May 1923, to “serve as a memorial of western pioneer life.” (McKoy 2000). The monument’s mission has since been expanded to also convey American Indian culture and history and to protect the spring and associated natural environment (Evenden et al. 2002).

Pipe Spring National Monument is located about 15 miles west of Fredonia in eastern Mohave County, Arizona (Figure 1.3.1). The monument is situated on the northern end of the Uinkaret Plateau, below the Vermilion Cliffs within the Arizona Strip (the northern portion of the state cut off by the Grand Canyon). The entire monument covers 40 acres (16 ha) and is embedded within the Kaibab Paiute Indian Reservation. Elevation within Pipe Spring National Monument ranges from 4,923 to 5,100 feet (1,500–1,555 m). Winter temperatures vary from 0 to 40°F, while summer temperatures reach highs of 90–115°F (Evenden et al. 2002).

1.3.2 Geology

The sandstone ridge to the northwest of Winsor Castle is comprised of Jurassic-age Navajo Sandstone deposited as part of a Sahara-like dune system that extended from Nevada to Wyoming approximately 180 million years ago. The Navajo

formation overlies Kayenta strata derived from early Jurassic river sediments. Navajo Sandstone is more permeable than the Kayenta, and the contact between the two formations is notable as a source of springs throughout the Colorado Plateau. The juxtaposition of this contact zone with the Sevier Fault (separating the mesa from the adjacent Moenkopi and Chinle beds to the east) accounts for the size and flow of the three springs in the monument (Pipe Spring, itself, and the smaller Tunnel and Cabin springs). Holocene-age alluvium covers the eastern and southern ends of the monument, burying the Triassic Chinle and Moenkopi formations (Billingsley 2004).

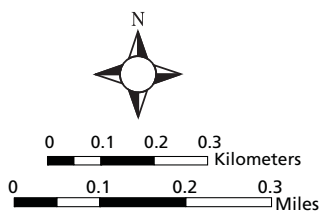
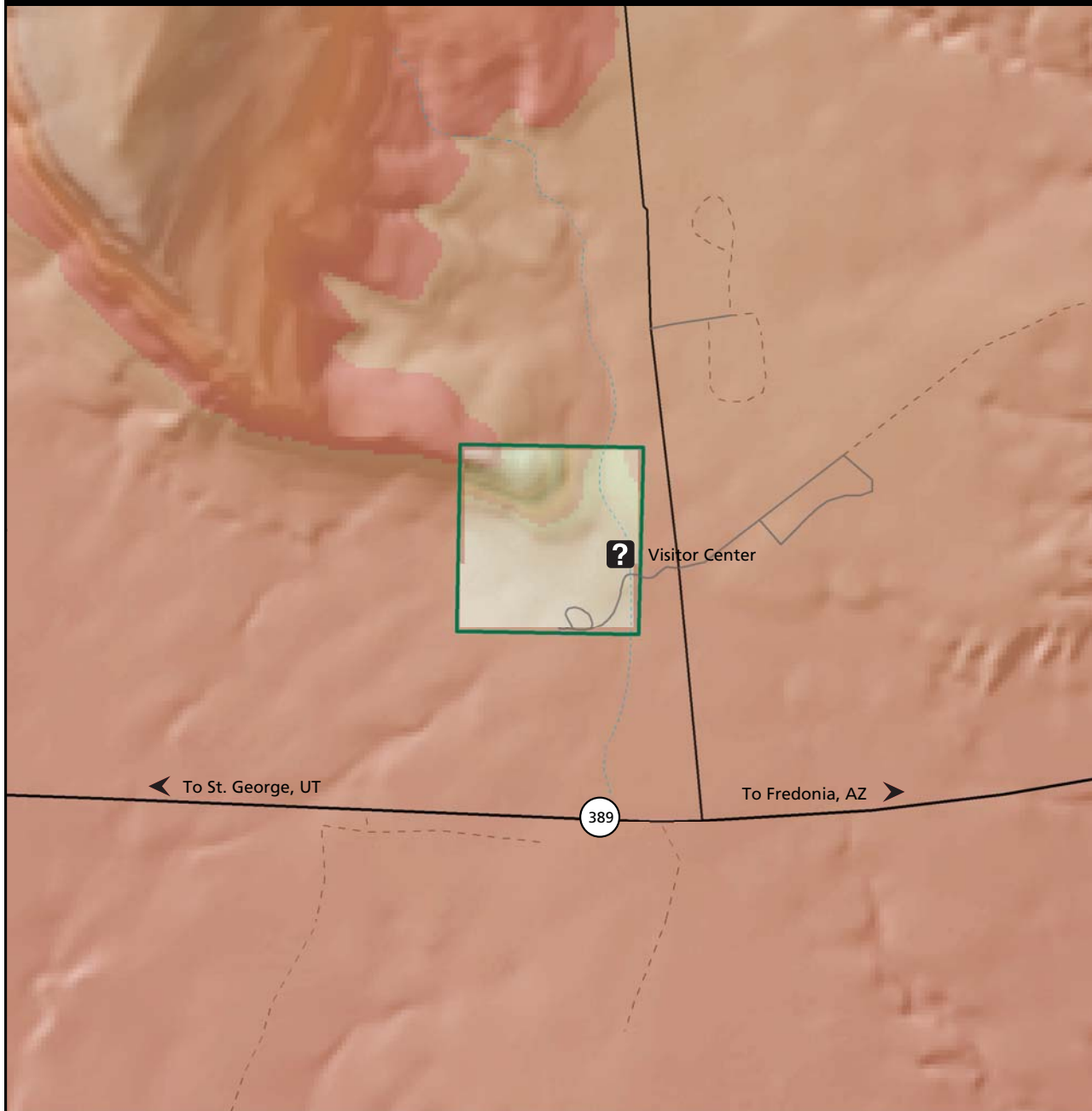
1.3.3 Vegetation

Unfortunately, the pre-settlement vegetation of Pipe Spring and the Arizona Strip was never studied in detail using modern scientific methods. Anecdotal reports by local ranchers describe the Strip as a “sea of grass” in the late 1860s (Alexander 1998a). In 1882, geologist Charles Dutton wrote that the Pipe Spring area had changed from being “covered with abundant grasses, affording rich pasturage to horses and cattle” to a place where “hardly a blade of grass is to be found within ten miles of the spring, unless upon the crags and mesas of the Vermilion Cliffs behind it” in just 10 years (Dutton 1882, cited in Alexander 1998a). Based on historic diaries, archives, and photographs, Alexander (1998a) reported that the mesa northwest of Pipe Spring was devoid of trees by the time NPS took over management in 1923, and the flats surrounding the fort were mostly bare ground.

Vegetation has slowly recovered in the monument. Today, three main plant communities can be recognized. Sandy flats and south-facing mesa slopes are inhabited by desert shrub vegetation, dominated by greenish rabbitbrush (*Chrysothamnus nauseosus*), fourwing saltbush (*Atriplex canescens*), and sand sagebrush (*Artemisia filifolia*) (Alexander 1998b). Steeper Navajo Sandstone slopes are dominated by open Utah juniper (*Juniperus osteosperma*) and two-needle pinyon (*Pinus edulis*) woodlands with an understory of turbinella live oak (*Quercus turbinella*) and Utah serviceberry (*Amelanchier utahensis*). Wet meadow vegetation consisting of baltic rush (*Juncus arcticus*), rabbitbrush, and scratchgrass (*Muhlenbergia asperifolia*) occurs below Cabin Spring (by West Cabin). A human-made pond, located just outside Winsor Castle, is dominated by planted white poplar (*Populus alba*), Fremont cottonwood (*P.*

Pipe Spring National Monument

Utah



Established May 31, 1923
1,500–1,555 meters elevation
(4,923–5,100 feet elevation)
16 hectares (40 acres)

Legend:

- Intermittent Streams
- Paved Road
- Unpaved Road
- Unimproved/4WD Road
- Park Boundary (NPS)
- Kaibab Reservation (IR)

Figure 1.3.1. Location of Pipe Spring National Monument, Mohave County, Arizona. Map created by Aneth Wight of NCPN (derived from Evenden et al. 2002).

fremontii), Carolina poplar (*P. x canadensis*), Siberian elm (*Ulmus pumila*), and tree-of-heaven (*Ailanthus altissima*). Much of the remainder of the grounds is dedicated to cultivated orchards and a replica pioneer garden.

1.3.4 Previous botanical studies

The first botanist to visit Pipe Spring was probably Ellen Powell Thompson, sister of John Wesley Powell and resident of Kanab, Utah, in the early 1870s (Alexander 2004). It is not known whether Thompson collected specimens at the future monument. Marcus E. Jones investigated the flora of Kanab and the Arizona Strip in the 1880s, but it is also unknown whether he specifically collected at Pipe Spring. Albert Siler, a pioneer rancher and naturalist in southern Utah, collected the type specimen of *Utahia sileri* (later renamed *Pediocactus sileri*), Siler's pincushion cactus, from "Cottonwood Springs and Pipe Springs, southern Utah" (actually Arizona) in 1883 (Benson 1982). This collection is now believed to have come from just outside the monument on the Kaibab Paiute Indian Reservation, as the exacting habitat conditions required by this rare cactus are not present within monument boundaries.

The holotype of Pipe Spring pricklypear (*Opuntia erinacea* var. *aurea*, *O. basilaris* var. *aurea*, or *O. aurea*, depending on one's taxonomic preference) was collected "1/2 mile north of Pipe Spring" by McCabe and McCabe in 1930 (Benson 1982). This locality is either within or barely outside the monument's boundary, but the species is well documented elsewhere in Pipe Spring National Monument. If accepted as being collected in the monument, the McCabe collection would stand as the earliest known specimen from the area (Table 1.3.4, Figure 1.3.4).

Leonard Heaton, custodian of Pipe Spring National Monument (PISP), began collecting plants for the PISP herbarium in 1934. Over the next seven years, Heaton and J. Whitehead collected 112 specimens for the herbarium, representing 98 species. Heaton (1935) compiled the first checklist of monument flora in 1935, citing 42 species and estimating that another 100 remained to be

discovered (in hindsight, a reasonable prediction). Robert Peebles (co-author of *Arizona Flora*) and A. R. Purchase added six new species in 1936, and later found two more in a 1940 visit—including the first report of *Opuntia pinkavae* (Pinkava's pricklypear), not recognized as a new species to science until 1997. Utah botanist Walter Cottam and Kathy Parker also collected a few new taxa in the 1940s.

Over the next quarter century, relatively little botanical work was done in the monument, except for some sporadic study in the early to mid-1960s. Ruth Nelson visited Pipe Spring twice starting in 1971, and added five new species to the flora. Richard King, a range conservationist with the Fredonia office of the Soil Conservation Service, compiled a species list in 1977 that included 82 plant species (with an emphasis on shrubs and grass species) (King 1977). King's list contained 39 new species for the monument, of which all but 18 have since been confirmed with vouchers.

The most intensive botanical surveys of Pipe Spring National Monument since the mid-1930s have taken place in the last decade. Zion National Park biologists Karen Mason and Bill LaBarre, who conducted a noxious-weed inventory in 1997, reported 13 new species for the monument (Kurth 1998). In 1998, Jason Alexander was hired by the NPS to research vegetation change within the monument and compile a revised species list. Alexander (1998b) documented 166 taxa for Pipe Spring National Monument, of which 63 represented new species. In 2001, Alexander, Denise Louie of Zion National Park, and Angie Evenden of the NCPN staff in Moab, Utah, collected 116 vouchers for the PISP herbarium (more than doubling it in size) and recorded 22 new species for the flora. This team also verified 60 previous literature reports with specimen vouchers (Table 1.3.4). More recently, we, along with Janet Coles of the NCPN vegetation staff, found 10 new species for the monument in fall 2007, and relocated 18 more species known only from historical or unvouchered reports.

Additional details on plant-collecting efforts at PISP can be found in Table 1.3.4.

Table 1.3.4. Chronology of plant-collecting efforts in Pipe Spring National Monument.

Year	Collector(s)	# of new taxa	Comments
1883	A. L. Siler	0	Albert L. Siler collected the holotype of <i>Pediocactus sileri</i> from "Cottonwood Springs and Pipe Springs, southern Utah" [Arizona] in 1883. Based on the specific habitat requirements of this species, it is now believed that the collection came from the adjacent Kaibab Paiute Indian Reservation rather than Pipe Spring National Monument, itself.
1930	McCabe and McCabe	1	McCabe and McCabe collected the holotype of <i>Opuntia erinacea</i> var. <i>aurea</i> "1/2 mile north of Pipe Spring" within or very near Pipe Spring National Monument.
1934–1939	L. Heaton, J. Whitehead, A. R. Purchase, and R. H. Peebles	98 + 7 reported	Leonard Heaton, custodian of Pipe Spring National Monument, compiled a vascular plant species list with 42 species in 1935 and noted "there are about 100 more plants that have not been [n]amed or classified..." (Heaton 1935). All but 7 of these species have been subsequently vouchered. From 1934–1939, Heaton and J. Whitehead collected 104 voucher specimens for the PISP herbarium and documented 92 plant taxa. In 1936, Robert H. Peebles discovered 4 new species for the monument and A.R. Purchase added 2 new grass species.
1940–1946	R. H. Peebles, W. Cottam, L. Heaton, and K. F. Parker	9	R. H. Peebles discovered 2 new species for PISP in 1940, including the first record of <i>Opuntia pinkavae</i> (later described as a new taxon by Bruce Parfitt in 1997). Walter Cottam and Leonard Heaton found 6 new taxa in 1941, including the earliest report of <i>Lepidium montanum</i> var. <i>stellae</i> (Stella's pepperwort; later described as a new taxon by Stan Welsh in 1978). Kathy Parker discovered <i>Convolvulus arvensis</i> (field bindweed) in the monument in 1946.
1961	F. Fanning	1	F. Fanning collected <i>Amsonia jonesii</i> (Jones' amsonia) in the monument (specimen at the Desert Botanical Garden herbarium).
1965–1967	E. Lehto and M. Ganz	5	Ganz and Lehto made at least 16 collections at Pipe Spring (deposited at Arizona State University, University of Arizona, and Northern Arizona University).
1971–1973	R. A. Nelson and M. G. MacLeod	5	Ruth Nelson and M. G. MacLeod made collections at PISP during visits in 1971 and 1973 (specimens are deposited at Arizona State University and the University of Wyoming).
1977	R. J. King	21 + 18 reported	Richard King, range conservationist with the Soil Conservation Service in Fredonia, Arizona, compiled an annotated checklist of 82 species for the monument (King 1977), including 39 that had not previously been reported. In subsequent years, 21 of King's new taxa were documented with vouchers.
1995	A. M. Phillips III	1	Arthur Phillips made 9 collections in the monument, including the first of <i>Rhus aromatica</i> var. <i>simplicifolia</i> (squawbush).
1997	K. Mason and B. LaBarre	8 + 5 reported	Zion NP biological science technicians Karen Mason and Bill LaBarre conducted a weed survey of PISP, reporting 13 new species for the area (Kurth 1998), of which 8 have been subsequently vouchered.
1998	J. Alexander	34 + 29 reported	Alexander (1998b) examined historic records and conducted a ground survey of the monument to compile a revised checklist of 166 vascular plant taxa for PISP. This list included 63 new species, of which 33 were later vouchered (29 are still known only from literature reports).
2001	J. Alexander, D. Louie, and A. Evenden	22	Jason Alexander, Denise Louie, and Angie Evenden collected 116 voucher specimens (doubling the size of the PISP herbarium) and documented 22 new species as well as making vouchers of over 60 previously reported taxa.
2007	W. Fertig and J. Coles	10	Walter Fertig and Janet Coles conducted surveys and vegetation sampling and added 33 specimens for the PISP herbarium, including 10 new to the monument and 18 that were previously considered historical or had been reported without a voucher.

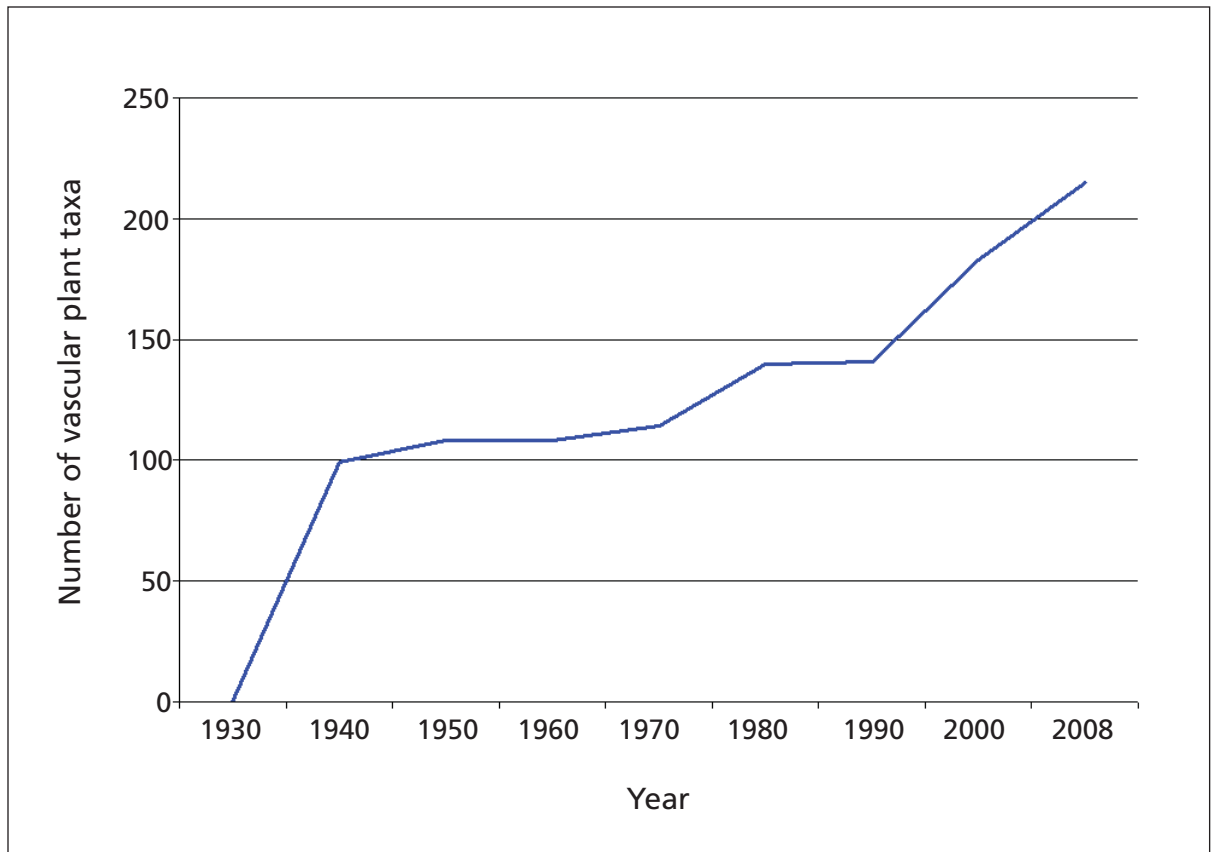


Figure 1.3.4. Increase in the number of plant taxa confirmed as present in Pipe Spring National Monument by decade, 1930–2008.

2 Methods

Under contract with the National Park Service, Jason Alexander reviewed all mounted specimens in the PISP herbarium in 2004 to determine whether each was correctly identified to species, subspecies, or variety following the nomenclature of Welsh et al. (2003). As necessary, he made corrections and annotations to each specimen and to the voucher records in PISP's Automated National Cataloging System (ANCS+) and NPSpecies database. Based on Alexander's herbarium work, we developed a revised checklist of species that were present in the monument (confirmed by an authenticated voucher) and those that were reported in the literature but not corroborated with a voucher (equivalent to "probably present" in NPSpecies terminology). Species that were now known to be misidentified or highly questionable were moved to a third list of rejected taxa. Finally, we developed a list of potential species ("unconfirmed" in NPspecies) known from the vicinity of Pipe Spring National Monument using an unpublished list generated by Dr. N. Duane Atwood of Brigham Young University.

Each list was annotated with supplemental information on life form, geographic range (within the context of Arizona), population size in the monument (derived from Jason Alexander's NPSpecies dataset for PISP and field observations), flowering period, distribution across general vegetation types, nativity, data source (collector and collection number from a sample specimen or literature citation), year of earliest collection (from herbar-

ium records), and relevant synonymy and taxonomic problems (based on review of Barkworth et al. 2003, 2007, Barneby 1989, Cronquist 1994, Cronquist et al. 1972, 1977, 1984, 1997, Dorn 2001, Flora of North America Editorial Committee 1993, 1997, 2000, 2002a, 2002b, 2003, 2005, 2006a, 2006b, 2006c, Holmgren et al. 2005, McDougall 1973, and Weber and Wittmann 2001). The annotations to these lists and label data from the PISP herbarium review were then incorporated into the NPSpecies database for the monument.

Work in 2007 focused on confirmation of reported and potential species for the monument flora through field surveys and review of collections from state and regional herbaria. We made one collecting trip to PISP, in October 2007, to target missing species, emphasizing under-sampled wetland, weedy, and late-flowering taxa. Herbarium studies were undertaken at Brigham Young University, Utah State University, and the University of Wyoming in March, June, and October 2006, and February and March 2007. We also documented monument specimens from the digital herbarium database of Arizona State University (<http://seinet.asu.edu/seinet/collections/selection.jsp?cat=plantae>) and its links to comparable databases for the Desert Botanical Garden, University of Arizona, and Northern Arizona University. Finally, we conducted an internet search of the virtual herbarium database of the New York Botanical Garden (<http://sciweb.nybg.org/science2/hcol/intf/index.asp>) and examined plot data from the NCPN vegetation mapping crew (NCPN, in ed.).

3 Results

3.1 Summary of the flora of Pipe Spring National Monument

In 2004, Jason Alexander completed a thorough review of the 227 vascular plant vouchers in the PISP herbarium (only 112 of which were collected prior to 2001). He found that 8 specimens were misidentified (3.5%), 3 needed to be revised to a more current name (1.3%), 27 needed variety or subspecies names added (11.9%), and 189 were correctly determined (83.3%). Based solely on these collections, the confirmed flora of Pipe Spring National Monument stood at 162 taxa. From 2005 to 2007, we located an additional 27 taxa from collections at the University of Wyoming's Rocky Mountain Herbarium and speci-

mens found through a database search of the Arizona State University digital database. Field surveys in 2007 netted another 26 new species (including 16 that were previously reported without a voucher). Overall, the documented flora of Pipe Spring National Monument has increased by 53 species (24.7%), bringing the total number of vouchered taxa to 215 (Table 3.1, Appendices A, D).

Currently, 62 additional taxa have been reported for PISP but have yet to be corroborated with a voucher specimen (Table 3.1, Appendix A). Of these, 7 were reported by Heaton (1935), 18 by King (1977), 5 by Kurth (1998), and 32 by Alexander (1998b). Taken together, the number of confirmed and reported vascular plant taxa in Pipe Spring National Monument stands at 277 taxa (Table 3.1, Appendix A).

Table 3.1. Statistical summary of the flora of Pipe Spring National Monument.

Category	Number confirmed in park	Number additionally reported for park	Total
Taxonomic diversity			
Total taxa (including varieties and subspecies)	215	62	277
Full species (excluding varieties and subspecies)	203	59	262
Families	54	2	56
Life form diversity			
Tree taxa	8	2	10
Shrub taxa	34	6	40
Perennial forb taxa	72	26	98
Annual forb taxa	72	9	81
Perennial graminoid taxa	21	15	36
Annual graminoid taxa	8	4	12
Fern taxa	0	0	0
Biogeographic diversity			
Introduced taxa	35	23	58
Native taxa			
Locally endemic taxa	4	0	4
Regionally endemic taxa	14	7	21
Disjunct taxa	0	0	0
Peripheral taxa	4	1	5
Sparse taxa	1	0	1
Widespread taxa	157	31	188
<i>Total native taxa</i>	<i>180</i>	<i>39</i>	<i>219</i>

The number of taxa and families is based on taxonomic concepts of Welsh et al. (2003). See Appendices, "Codes and Definitions", for an explanation of the various categories.

Entering the 2007 field season, 41 taxa were recognized as potentially occurring in PISP based on the proximity of the monument to known populations (Alexander NPSpecies database). Including five additional species identified by Duane Atwood, the current number of potential species for Pipe Spring National Monument is 46 (Appendix B).

Based on his evaluation of the PISP herbarium, Jason Alexander found 8 taxa that were falsely reported due to misidentification. We consider an additional seven species cited (but not vouchered) by Heaton (1935) and King (1977) to be questionable based on the absence of suitable habitat or the distance of Pipe Spring National Monument to the known or expected range of each species (Appendix C).

The confirmed and reported flora of Pipe Spring National Monument represents 6.5% of the 4,241 native and naturalized taxa documented for the state of Arizona by Kartesz (2003) and 34.8% of the state's 161 plant families (Table 3.1). Within Mohave County, the monument flora captures 17.4% of the 1,588 taxa reported by Kartesz (2003). At the ecoregional scale, Pipe Spring National Monument contains 11.0% of the 2,517 species of seed plants and pteridophytes reported for northern Arizona by McDougall (1973) and the Flora of North America Editorial Committee (1993).

3.2 Life form and biogeographic diversity

Although ecologically dominant, tree and shrub species make up only 18% of the confirmed and reported plant taxa of Pipe Spring National Monument (Table 3.1). Perennial forbs are the most species-rich life form in the monument's flora, with 98 known and reported taxa (35.4% of the total flora). Annual forbs and grass-like plants are unusually species-rich in the monument (relative to other floras in the Colorado Plateau), comprising 33.5% of all taxa. Like trees and shrubs, perennial graminoids are ecologically important but relatively species-poor, representing just 13% of the total flora. No ferns or fern-allies have been found in PISP (Table 3.1).

Of the monument's 219 native taxa, 188 (85.8%) are widespread across Arizona and western North America. Only four species (1.8% of the monument's native flora) have extremely limited global distributions (local endemics found within

an area of less than 1° of latitude × 2° of longitude; see Appendix A for complete definitions of biogeographic categories). Regional endemics (largely restricted to the Colorado Plateau) comprise an additional 9.6% of the monument flora (Table 3.1). Species at the edge of their range (peripheral) or found sparsely across the state make up just 2.8% of the total flora.

3.3 Plants of special concern

Pipe Spring National Monument has no plants listed as threatened or endangered under the U.S. Endangered Species Act (ESA). Siler's pincushion cactus (*Pediocactus sileri*), listed as threatened under the ESA, is known from adjacent areas of the Kaibab Paiute Indian Reservation (Siler's type specimen comes from "Pipe Spring"), but is not thought to occur within the monument itself due to a lack of suitable gypsiferous Moenkopi soils (ARPC, no date). The federally threatened Jones' cycladenia (*Cycladenia humilis* var. *jonesii*) is also known from Chinle soils west of Pipe Spring, but is unlikely to be found in the monument.

The Arizona Game and Fish Department (AGF)'s Heritage Data Management System (2008) tracks three cactus species from PISP as species of concern (Table 3.3). All are listed as Salvage Restricted (collection prohibited except with a permit) under the 1993 Arizona Native Plant Law (ARPC, no date). Atwood's wild-buckwheat (*Eriogonum thompsoniae* var. *atwoodii*) and Morton wild-buckwheat (*E. mortonianum*) are also tracked as species of concern by AGF and known from the Kaibab Paiute Indian Reservation, but have not been documented in Pipe Spring National Monument.

Two recently described species with narrow geographic ranges currently lack any protective status but might warrant management attention. Stella's pepperwort (*Lepidium montanum* var. *stellae*) is restricted to southern Utah and northern Arizona (Welsh et al. 2003), where it typically occurs on gypsum-rich, Moenkopi-derived soils. Leonard Heaton collected this species at or near Pipe Spring in 1941 (suitable habitat is more likely just outside the monument), but it remained unidentified until annotated by Jason Alexander in 2004. Pinkava's pricklypear (*Opuntia pinkavae*) is also restricted to the Utah-Arizona border and was first recorded at Pipe Spring in 1940 by Robert Peebles. The holotype of *O. pinkavae* comes from Bulrush Canyon, south of Pipe Spring (Parfitt 1997).

Table 3.3. Plant species of conservation concern from Pipe Spring National Monument.

Family	Species	Common name	TNC global rank ¹	Federal legal status	AZ status ²
Cactaceae	<i>Opuntia erinacea</i> var. <i>aurea</i> (<i>O. basilaris</i> var. <i>aurea</i>)	Pipe Spring pricklypear	G3	None	Salvage Restricted, S3
Cactaceae	<i>Opuntia whipplei</i> var. <i>whipplei</i>	Whipple's cholla	G4?T4?	None	Salvage Restricted, S1
Cactaceae	<i>Sclerocactus whipplei</i> var. <i>roseus</i> (<i>S. parviflorus</i> ssp. <i>intermedius</i>)	small-flower fishhook cactus	G4T3?	None	Salvage Restricted, S2

This list is derived from Arizona Game and Fish Department Heritage Data Management System (2008) and Arizona Rare Plant Committee (no date). ¹TNC global rank assesses abundance and conservation priority on a scale of 1–5 (1 being extremely vulnerable and 5 being secure) for full species (G) and varieties or subspecies (T) across their entire range. A “?” indicates uncertainty in the rank. A comparable scoring system is used to measure state abundance (S) in Arizona under the column “AZ status”.

²AZ status includes protection afforded under the 1993 Arizona Native Plant Law.

3.4 Noxious weeds

Introduced plant species (not historically native to Arizona or North America) make up 20.9% of the confirmed and reported flora of Pipe Spring National Monument (Table 3.1). This figure is substantially higher than the statewide average of 12.7% non-native species (Kartesz 2003). Of the 58 introduced plant species confirmed or reported for PISP (Table 3.1), only four are listed as noxious by the State of Arizona (ADAPSD 2005). Scotch thistle (*Onopordum acanthium*) is on the state’s prohibited and restricted noxious weed lists, while field bindweed (*Convolvulus arvensis*), common purslane (*Portulaca oleracea*), and puncturevine (*Tribulus terrestris*) are listed as prohibited and regulated noxious weeds.

Kurth (1998) cited 34 non-native species of management concern, based on a 1997 survey of the monument by Karen Mason and Bill LaBarre of Zion National Park. These consisted primarily of introduced ornamental trees that have become weedy or exotic forbs and grasses that are common agricultural or rangeland pests. Using a matrix of significance of impact and feasibility of control, Kurth classified these species into four groups: low threat/easy to control, low threat/hard to control, serious threat/easy to control, and serious threat/hard to control. Four species were recommended for immediate control: tree-of-heaven (*Ailanthus altissima*), white poplar (*Populus alba*), tamarisk (*Tamarix chinensis*), and Siberian elm (*Ulmus pumila*).

4 Discussion

Beginning with Leonard Heaton's first species list in 1935, the known flora of Pipe Spring National Monument has grown from 42 species to 277 taxa (Tables 1.3.4 and 3.1, Figure 1.3.4, Appendix A). Based on available habitats and proximity, at least another 46 plant taxa may occur within the monument (Appendix B). Should all of these potential species be found, the documented flora of PISP would increase by nearly 14%. Many of the "missing" potential or reported taxa consist of cryptic species that flower late in the growing season, or occur in undersampled wetland or weedy habitats. Confirmation of reported species should remain a high priority, as some of these taxa may ultimately prove to be erroneous. Pipe Spring also has a high percentage of plants known only from

historic records (pre-dating 1970) that should be a priority for re-location to confirm that they are still extant. Further examination of monument collections from other herbaria in Arizona or major national collections (such as Harvard University's Gray Herbarium, the New York Botanical Garden, and the Smithsonian Institution's U.S. National Herbarium) may result in the confirmation of additional records of historical species for the monument. Additional field studies would also be useful to better refine the abundance and distribution of species of high management interest (especially rare plants and invasive non-natives). Surveys following wet winters would likely lead to the discovery of new annual native and exotic species. Lastly, better documentation of plant species previously or currently grown in the monument's orchard and pioneer garden is needed.

5 Literature Cited

- Alexander, J. 1998a. Pipe Spring National Monument presettlement vegetation literature survey. Pipe Spring National Monument, Az. 43 pp.
- . 1998b. Pipe Spring National Monument master vegetation species list. Report prepared for the National Park Service, Pipe Spring National Monument.
- . 2004. A summary of floristics at Pipe Spring National Monument. Pipe Spring National Monument, Az. 3 pp.
- Arizona Department of Agriculture, Plant Services Division (ADAPSD). 2005. Prohibited, regulated and restricted noxious weeds.
- Arizona Game and Fish Department Heritage Data Management System. 2008. Special status species by taxon, scientific name. http://www.azgfd.gov/w_c/edits/hdms_species_lists.shtml
- Arizona Rare Plant Committee (ARPC). No date. Arizona rare plant field guide: A collaboration of agencies and organizations.
- Barkworth, M. E., K. M. Capels, S. Long, and M. B. Piep, eds. 2003. Magnoliophyta: Commelinidae (in part): Poaceae, part 2. *Flora of North America north of Mexico*, volume 25. New York: Oxford University Press. 783 pp.
- Barkworth, M. E., K. M. Capels, S. Long, L. K. Anderton, and M. B. Piep, eds. 2007. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. *Flora of North America north of Mexico*, volume 24. New York: Oxford University Press. 911 pp.
- Barneby, R. C. 1989. Volume 3, Part B. Fabales. In Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren, eds., *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 279 pp.
- Benson, L. 1982. *The cacti of the United States and Canada*. Stanford, Ca.: Stanford University Press. 1044 pp.
- Billingsley, G. H., S. S. Priest, and T. J. Felger. 2004. Geologic map of Pipe Spring National Monument and the western Kaibab-Paiute Indian Reservation, Mohave County, Arizona. Pamphlet to accompany Scientific Investigations Map 2863. U.S. Geological Survey, U.S. Department of the Interior.
- Cronquist, A. 1994. Volume 5, Asterales. In Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren, eds., *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 496 pp.
- Cronquist, A., A. H. Holmgren, N. H. Holmgren, and J. L. Reveal, eds. 1972. Volume 1, Geological and botanical history of the region, its plant geography and a glossary: The vascular cryptogams and the gymnosperms. *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 270 pp.
- Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren, eds. 1977. Volume 6, The Monocotyledons. *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 584 pp.
- . 1984. Volume 4, Subclass Asteridae (except Asteraceae). *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 573 pp.
- Cronquist, A., N. H. Holmgren, and P. K. Holmgren, eds. 1997. Volume 3, Part A, Subclass Rosidae (except Fabales). *Intermountain flora: Vascular plants of the Intermountain West*, U.S.A. Bronx, N.Y.: New York Botanical Garden. 446 pp.
- Dorn, R. D. 2001. *Vascular plants of Wyoming*. Third edition. Cheyenne, Wy.: Mountain West Publishing. 412 pp.
- Eviden, A., M. Miller, M. Beer, E. Nance, S. Daw, A. Wight, M. Estenson, and L. Cudlip. 2002. Northern Colorado Plateau Vital Signs Network and Prototype Cluster, plan for natural resources monitoring: Phase I Report [two volumes]. National Park Service, Northern Colorado Plateau Network, Moab, Ut. 138 pp + app.
- Flora of North America Editorial Committee. 1993. Pteridophytes and gymnosperms. *Flora of North America north of Mexico*, Volume 2. New York: Oxford University Press. 475 pp.
- . 1997. Magnoliophyta: Magnoliidae and Hamamelidae. *Flora of North America north of Mexico*, Volume 2. New York: Ox-

- ford University Press. 590 pp.
- . 2000. Magnoliophyta: Alismatidae, Arecidae, Commelinidae (in part), and Zingiberidae. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 352 pp.
- . 2002a. Magnoliophyta: Commelinidae (in part): Cyperaceae. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 608 pp.
- . 2002b. Magnoliophyta: Liliidae: Liliales and Orchidales. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 723 pp.
- . 2003. Magnoliophyta: Caryophyllidae, part 1. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 559 pp.
- . 2005. Magnoliophyta: Caryophyllidae, part 2. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 656 pp.
- . 2006a. Magnoliophyta: Asteridae, part 6: Asteraceae, part 1. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 579 pp.
- . 2006b. Magnoliophyta: Asteridae, part 7: Asteraceae, part 2. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 666 pp.
- . 2006c. Magnoliophyta: Asteridae, part 8: Asteraceae, part 3. *Flora of North America north of Mexico, Volume 2*. New York: Oxford University Press. 616 pp.
- Heaton, L. 1935. *Plants from Pipe Spring National Monument*.
- Holmgren, N. H., P. K. Holmgren, and A. Cronquist. 2005. Volume 2, Part B Subclass Dilleniidae. *Intermountain flora: Vascular plants of the Intermountain West, U.S.A.* Bronx, N.Y.: New York Botanical Garden. 488 pp.
- Kartesz, J. T. 2003. Synthesis of the North American flora, Version 2.0. <http://www.bonap.org/synth.html>.
- Kearney, T. H., and R. H. Peebles. 1960. *Arizona flora*. Second edition. Berkeley: University of California Press. 1085 pp. (with supplement by J. T. Howell, E. McClintock, and collaborators).
- King, R. J. 1977. *The flora of Pipe Spring National Monument*. Report prepared for the National Park Service by the Soil Conservation Service, Fredonia, Arizona.
- Kurth, L. 1998. *Pipe Spring National Monument non-native plants survey report, 1997*. Report prepared for Pipe Spring National Monument by Zion National Park. 3 pp.
- Leach, N. 1999. *Pipe Spring National Monument: An ancient oasis on a storied frontier*. Springdale, Ut.: Zion Natural History Association.
- Margules, C. R., and R. L. Pressey. 2000. Systematic conservation planning. *Nature* 405:243–253.
- McDougall, W. B. 1973. *Seed plants of northern Arizona*. Flagstaff: Museum of Northern Arizona. 594 pp.
- McKoy, K. L. 2000. *Cultures at a crossroads: An administrative history of Pipe Spring National Monument*. Cultural Resources Selections No. 15, Intermountain Region. Denver, Co.: National Park Service.
- National Park Service (NPS). 2000. *Management Policies*. Washington, D.C.: U.S. Department of Interior, National Park Service. Publication # NPS D1416. 137 pp.
- Northern Colorado Plateau Network (NCPN). in ed. *Pipe Spring National Monument vegetation classification and mapping project*.
- Noss, R. F., and A. Y. Cooperrider. 1994. *Saving nature's legacy: Protecting and restoring biodiversity*. Washington, D.C.: Island Press. 416 pp.
- Parfitt, B. D. 1997. *Opuntia pinkavae* (Cactaceae), a new species from Arizona and Utah. *Rhodora* 99:223–228.
- Weber, W. A., and R. C. Wittmann. 2001. *Colorado flora: Western Slope*. Third edition. Boulder: University Press of Colorado. 488 pp.
- Welsh, S. L., N. D. Atwood, S. Goodrich, and L. C. Higgins. 2003. *A Utah flora*. Third edition, revised. Provo, Ut.: Brigham Young University. 912 pp.

6 Appendices

The following appendices contain annotated checklists of the vascular flora of Pipe Spring National Monument.

Appendix A lists all species that have been confirmed for the flora with an authenticated voucher specimen (including extant and historical records), or that have been reliably reported for the monument in the literature (Heaton 1935, King 1977, Alexander 1998b). Vouchers were examined from the PISP herbarium and collections from Brigham Young University (BRY), the University of Wyoming (RM), and the digital museum databases of the New York Botanical Garden (NY), Northern Arizona University, Arizona State University, University of Arizona, and the Desert Botanical Garden. Species entries in Appendix A are organized alphabetically by family and genus.

Species listed in Appendix B are known from the vicinity of Pipe Spring National Monument, but have not previously been reported or confirmed for the monument; that is, these species may potentially occur within PISP, based on the proximity of the monument to other populations or the presence of suitable habitat. Species on this list are derived from a checklist of potential species for NCPN parks prepared by Dr. N. Duane Atwood, of Brigham Young University, in 2001, and Jason Alexander for the PISP NPSpecies database. Some species from Appendix C could be considered as potentially occurring in the monument, but are not included here.

Appendix C lists species that have been previously reported for Pipe Spring National Monument from published and unpublished literature (Alexander 1998a, Heaton 1935, King 1977) or from herbarium specimens, but are now considered erroneous because they were based on misidentified specimens (False Reports or FalsRep), questionable literature records, or because the monument is well outside the known or expected range of the species (Questionable or Ques?).

Appendix D contains the same confirmed, historical, and reported taxa as in Appendix A, but organized by life form rather than by family in order to better meet the needs of NPS interpretive specialists.

The codes and references for each field in the appropriate appendices are summarized below.

Family (Appendices A, B, C, and D)

Family concepts and nomenclature follow *A Utah Flora* (Welsh et al. 2003). Alternative family names and treatments from other regional floras (Dorn 2001, Flora of North America Editorial Committee 1993, 2002b, Holmgren et al. 2005, Kearney and Peebles 1960, McDougall 1973, Weber and Wittman 2001) are listed in parentheses.

Species name (Appendices A, B, C, and D)

Nomenclature for scientific names and taxonomic concepts are derived from Welsh et al. (2003). Scientific names are listed in alphabetical rather than phylogenetic order.

Synonyms/Taxonomic notes (Appendices A, B, and C)

Pertinent synonyms are included for species with alternative scientific names in other recent state and regional floras (Barkworth et al. 2003, 2007, Barneby 1989, Cronquist 1994, Cronquist et al. 1972, 1977, 1984, 1997, Dorn 2001, Flora of North America Editorial Committee 1993, 1997, 2000, 2002a, 2002b, 2003, 2005, 2006a, 2006b, 2006c, Holmgren et al. 2005, Kearney and Peebles 1960, McDougall 1973, and Weber and Wittmann 2001). No effort has been made to identify additional synonyms from monographs and floras preceding the early 1970s.

Common name (Appendices A, B, C, and D)

Common names are derived primarily from Welsh et al. (2003) and the Intermountain Flora (Barneby 1989, Cronquist 1994, Cronquist et al. 1972, 1977, 1984, 1997, Holmgren et al. 2005).

Life form (Appendices A, B, C, and D)

Life form is based on the stature and growth habit of typical members of a species at reproductive maturity. Annual Forbs (AnnF) are broad-leaved dicots or monocots with non-woody stems that complete their life cycle (mature, flower, and die) in one year. Annual Graminoids (AnnG) are linear-leaved, grass-like monocots that complete their life cycle (mature, flower, and die) in one year. Ferns and fern-allies (Fern) are non-flowering vascular plants that reproduce by spores. Perennial Forbs (PerF) are broad-leaved dicots or monocots with non-woody stems (at least above

ground level) that live for multiple years. Perennial Graminoids (PerG) are linear-leaved, grass-like monocots that live for multiple years. Shrubs are woody perennials with one to many trunks arising from near the base of the plant and are usually less than 3.5 m tall. Trees are woody perennials with a single stem or trunk and are typically over 3.5 m tall.

Range (Appendices A, B, and C)

Range represents the distribution of a species within Arizona and the state's contribution to the plant's overall global range. Disjunct (Disj) taxa have their Arizona distribution separated from the main, contiguous portion of their range by a gap of more than 800 km (ca. 500 miles). Introduced (Intro) taxa are those that are not native to Arizona or North America but have become naturalized (breeding on their own without human assistance). Local Endemics (LocEn) are taxa in which the entire global range is restricted to an area of less than 16,500 km² (ca. 6,370 mi², or 1° of latitude × 2° of longitude). Peripheral (Periph) taxa have a widespread global distribution but occur at the margin of their contiguous range in Arizona and occupy less than 5% of the state's area (usually only within a few miles of the state border). Regional Endemics (RegEn) are taxa with a global range of 16,500–250,000 km² (an area about the size of the state of Wyoming). Sparse taxa occur widely across Arizona or North America but their range within Arizona is small and patchy, with populations restricted to specialized or uncommon habitats. Widespread (Wide) taxa have global ranges exceeding 250,000 km² and occur over at least 10% of the state.

Park status (Appendices A, C, and D)

Park status identifies whether a species is Present (Pres), Historical (Hist), or Reported (Rep) for Pipe Spring National Monument. Species are considered Present if a confirmed voucher or documented observation has been made within monument boundaries since 1970. Historical species have been confirmed with a voucher from the monument but have not been relocated since before 1970. Reported species are listed for the monument in the literature (Heaton 1935, King 1977, Alexander 1998b), but have not been corroborated with a voucher specimen. Species that may potentially occur in PISP are listed in Appendix B. Rejected taxa (listed in Appendix C) have either been falsely reported (FalsRep) in the literature based on misidentified herbarium speci-

mens or are considered Questionable (Ques?) because park reports are from well outside their known or expected range.

Pop. size (Appendix A)

Population size refers to the abundance and frequency with which a species occurs within Pipe Spring National Monument. Abundance data are derived from the PISP NPSpecies database and personal observations. Abundant (Abun) taxa have large populations, have a broad ecological amplitude (often being dominant in one to several vegetation types), or occur extensively across the monument. Common (Com) taxa have large local populations but may be restricted to a single vegetation type or do not occur across the entire monument. Uncommon (Unc) taxa have low to medium-sized populations, typically have a narrow ecological amplitude (or at least contribute relatively little to total vegetative cover), or have a small range across the monument. Rare taxa usually have low population numbers and are restricted to a single location within the monument. A “?” indicates that population size is unknown.

Source (Appendix A)

Sources are the evidence for the assigned park status. In the case of Present and Historical taxa, sources are herbarium records (with collector, collection number, and repository) that were corroborated during this study. For reported taxa, the source is a published or unpublished reference citing the species within the monument. Specimen repositories include the Pipe Spring National Monument herbarium (PISP), Brigham Young University (BRY), Utah State University (USU), New York Botanical Garden (NY), the University of Wyoming's Rocky Mountain Herbarium (RM), Northern Arizona University, Arizona State University, University of Arizona, and Desert Botanical Garden.

Year doc. (Appendix A)

Year documented indicates the first year in which a species was confirmed or reported to occur in Pipe Spring National Monument. This year does not necessarily correspond with the date of the voucher specimen cited under Source. “NA” indicates that the first year is not known (used mostly for “reported” taxa).

Comments (Appendices A, B, C, and D)

This column includes additional comments on the status of a particular species in the monument, the place of origin for introduced species, legal status, and other data.

Nativity (Appendix D)

Nativity indicates whether a species is native to Arizona or introduced (Intro) based on McDougall (1973) and Kartesz (2003).

Flower time (Appendix D)

Flower Time refers to the months in which a species is most likely to be in flower. NA indicates a species that is a non-flowering fern or gymnosperm.

Habitat (Appendix D)

The distribution of species across generalized habitats in Pipe Spring National Monument is indicated by an “x” in the columns DesSh through Wet and is derived from the vegetation classification used by Alexander (1998b). DesSh = Desert shrub vegetation of flats and foothills below the monument’s Navajo Sandstone mesa dominated by greenish rabbitbrush (*Chrysothamnus nauseosus* var. *consimilis*), fourwing saltbush (*Atriplex canescens*), and sand sagebrush (*Artemisia filifolia*). PinJun = Pinyon-Juniper woodlands/rimrock dominated by Utah juniper (*Juniperus osteosperma*), Two-needle pinyon (*Pinus edulis*), turbinella live oak (*Quercus turbinella*), and Utah serviceberry (*Amelanchier utahensis*). Wet = Wet meadows associated with natural seeps and springs. Additional comments are included for species that are restricted to a particular soil/geologic type or are found mostly in disturbed sites.

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Agavaceae (Liliaceae)	<i>Yucca baccata</i>	<i>Y. baccata</i> var. <i>baccata</i>	datil yucca	Shrub	Wide	Pres	Unc	Evenden & Louie PISP 25 (PISP)	1977	According to J. Alexander, speci- men might also be <i>Y. vespertina</i> (collected with flowers only)
Agavaceae (Liliaceae)	<i>Yucca kanabensis</i>	<i>Y. angustissima</i> var. <i>kanabensis</i>	Kanab yucca	Shrub	LocEn	Pres	Unc	Alexander 1254 (PISP)	1977	Type locality is divide between Mt. Carmel & Kanab, Kane Co., UT (McKelvey 4347a A). USFWS: 3C
Amaranthaceae	<i>Amaranthus blitoides</i>	<i>A. graecizans</i>	prostrate pigweed	AnnF	Wide	Pres	Unc	Alexander 1232 (PISP)	2001	King (1977) cited " <i>Amaranthus</i> sp."
Amaranthaceae	<i>Amaranthus hypochochrysiacus</i>		grain amaranth	AnnF	Intro	Pres	Unc	Fertig 23683 (PISP)	2007	Native to SW USA
Anacardiaceae	<i>Rhus aromatica</i> var. <i>simplicifolia</i>	<i>R. trilobata</i> var. <i>simplicifolia</i>	squawbush	Shrub	Wide	Pres	Unc	Phillips 95-101 (NAU)	1995	
Anacardiaceae	<i>Rhus aromatica</i> var. <i>trilobata</i>	<i>R. trilobata</i> var. <i>trilobata</i>	squawbush	Shrub	Wide	Rep	?	Heaton (1935)	1935	
Apocynaceae	<i>Amsonia jonesii</i>		Jones' amsonia	PerF	RegEn	Hist	?	Fanning s.n. (Desert Bot Garden)	1961	
Apocynaceae	<i>Amsonia tomentosa</i> var. <i>stenophylla</i>	<i>A. eastwoodiana</i>	tomentose amsonia	PerF	Sparse	Hist	?	Heaton s.n. (PISP)	1936	PISP specimen is the " <i>brevifolia</i> " form
Apocynaceae	<i>Apocynum cannabinum</i>	Includes vars. <i>cannabinum</i> , <i>glaberrimum</i> , & <i>angustifolium</i>	common dogbane	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Asclepiadaceae	<i>Asclepias latifolia</i>		broadleaf milkweed	PerF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Asclepiadaceae	<i>Asclepias subverticillata</i>	<i>A. galioides</i>	whorled milkweed	PerF	Wide	Pres	Unc	Alexander 1225 (PISP)	1936	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Boraginaceae	<i>Cryptantha circumscissa</i>		cushion cryptanth	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Boraginaceae	<i>Cryptantha confertiflora</i>		basin yellow cryptanth	PerF	Wide	Pres	Unc	Nelson 9311 (RM)	1937	
Boraginaceae	<i>Cryptantha crassispala</i> var. <i>elachantha</i>		thick-sepaled cryptanth	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Boraginaceae	<i>Cryptantha flava</i>	<i>Oreocarya flava</i>	plateau yellow cryptanth	PerF	Wide	Rep	?	Alexander (1998b)	NA	
Boraginaceae	<i>Cryptantha fulvocanescens</i>	Includes vars. <i>fulvocanescens</i> & <i>echinooides</i> , <i>Oreocarya</i> <i>fulvocanescens</i>	plateau cryptanth	PerF	RegEn	Hist	?	Heaton 24 (PISP)	1937	Type locality of var. <i>echinooides</i> is Paria Canyon, Garfield Co., UT (Jones 5297p POM)
Boraginaceae	<i>Cryptantha gracilis</i>		slender cryptanth	AnnF	Wide	Hist	?	Heaton 14 (PISP)	1937	
Boraginaceae	<i>Cryptantha micrantha</i>		redroot cryptanth	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	Type locality is "Southern Utah" (Parry 164)
Boraginaceae	<i>Cryptantha pterocarya</i> var. <i>cycloptera</i>		wingnut cryptanth	AnnF	Wide	Hist	?	Heaton 13 (PISP)	1937	
Boraginaceae	<i>Cryptantha pterocarya</i> var. <i>pterocarya</i>		wingnut cryptanth	AnnF	Wide	Pres	Unc	Evenden & Louie PISP 16 (PISP)	2001	
Boraginaceae	<i>Heliotropium convolvulaceum</i>	<i>Euploca convolvulacea</i> ssp. <i>californica</i>	bindweed heliotrope	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Boraginaceae	<i>Lappula occidentalis</i> var. <i>cupulata</i>	<i>L. texana</i> , <i>L. marginata</i> , <i>L. redowskii</i> var. <i>cupulata</i>	cupseed stickseed	AnnF	Wide	Pres	Unc	Evenden & Louie PISP 14 (PISP)	1941	
Boraginaceae	<i>Plagiobothrys jonesii</i>		Jones' popcorn- flower	AnnF	RegEn	Pres	Unc	Evenden & Louie PISP 15 (PISP)	2001	PISP specimen has unusually large flowers

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Cactaceae	<i>Echinocereus engelmannii</i> var. <i>variegatus</i>	<i>E. engelmannii</i> var. <i>decumbens</i> . Vars. not recognized in <i>Flora of North America</i> (2003)	Glen Canyon hedgehog cactus	PerF	RegEn	Rep	?	Alexander (1998b)	1998	
Cactaceae	<i>Echinocereus triglochidiatus</i> var. <i>melanacanthus</i>	Includes var. <i>inermis</i> . Vars. not recognized in <i>Flora of North America</i> (2003)	claretcup	PerF	Wide	Pres	Unc	Heaton s.n. (PISP)	1936	
Cactaceae	<i>Echinocereus triglochidiatus</i> var. <i>mojavensis</i>	Vars. not recognized in <i>Flora of North America</i> (2003)	Mohave claretcup	PerF	Wide	Hist	?	Peebles 14696 (ARIZ)	1940	
Cactaceae	<i>Opuntia erinacea</i> var. <i>aurea</i>	<i>O. aurea</i> , <i>O. basilaris</i> var. <i>aurea</i>	Pipe Spring pricklypear	PerF	LocEn	Pres	Com	MacLeod 422 (ASU)	1930	Type locality is 1/2 mile N of Pipe Spring, Mohave Co., AZ (McCabe & McCabe s.n. DS)
Cactaceae	<i>Opuntia erinacea</i> var. <i>utahensis</i>	Var. not recognized in <i>Flora of North America</i> (2003); considered a few-spined variant of <i>O. polyacantha</i>	Utah pricklypear	PerF	Wide	Pres	Com	MacLeod 428 (ASU)	1971	
Cactaceae	<i>Opuntia fragilis</i>	<i>O. fragilis</i> var. <i>brachyartha</i>	brittle pricklypear	PerF	Wide	Rep	?	King (1977), Alexander (1998b)	1977	
Cactaceae	<i>Opuntia phaeacantha</i> var. <i>major</i>	Vars. not recognized in <i>Flora of North America</i> (2003)	large pricklypear	PerF	Wide	Pres	Unc	Ganz 177 (ASU)	1965	Also cited by Alexander (1998b)
Cactaceae	<i>Opuntia pinkavae</i>	<i>O. basilaris</i> var. <i>woodburyi</i> , considered part of <i>O. macrorhiza</i> in <i>Utah Flora</i> (2003)	Pinkava's pricklypear	PerF	LocEn	Pres	Unc	Lehto s.n. (ASU)	1940	Type locality is NW of Bullrush Canyon S of Pipe Spring, Mohave Co., AZ (Parfit 2874 ASU)

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Cactaceae	<i>Opuntia whipplei</i> var. <i>whipplei</i>	<i>Cylindropuntia whipplei</i>	Whipple's cholla	Shrub	RegEn	Pres	Unc	King (1977), Alexander (1998b)	1977	Photographed (but not vouchered) by W. Fertig, 2007
Cactaceae	<i>Sclerocactus whipplei</i> var. <i>roseus</i>	<i>S. parviflorus</i> , <i>S. whipplei</i> var. <i>intermedius</i> . Includes <i>S. contortus</i> & <i>S. terrae-canyonae</i>	smallflower fishhook cactus	PerF	Periph	Pres	Unc	Evenden & Louie PISP 26 (PISP)	1998	Type of <i>S. intermedius</i> is 9 mi SW of Pipe Spring, Mohave Co., AZ (Peebles & Parker 14712 CAS)
Capparaceae (Cleomaceae)	<i>Cleome lutea</i>		yellow beeplant	AnnF	Wide	Pres	Unc	Alexander 1187 (PISP)	1935	
Chenopodiaceae	<i>Atriplex argentea</i> var. <i>argentea</i>	<i>A. argentea</i>	silver orach	AnnF	Wide	Pres	Unc	Alexander 1236 (PISP)	2001	
Chenopodiaceae	<i>Atriplex canescens</i> var. <i>canescens</i>	<i>A. canescens</i> var. <i>occidentalis</i>	fourwing saltbush	Shrub	Wide	Pres	Com	Alexander 1212 (PISP)	1966	
Chenopodiaceae	<i>Chenopodium album</i> var. <i>album</i>	<i>C. album</i>	lambquarter	AnnF	Intro	Pres	Unc	Alexander 1261 (PISP)	1998	Native to Eurasia
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>fremontii</i>	<i>C. fremontii</i>	Fremont's goosefoot	AnnF	Wide	Pres	Unc	Alexander 1192 (PISP)	2001	
Chenopodiaceae	<i>Chenopodium leptophyllum</i>		narrowleaf goosefoot	AnnF	Wide	Rep	?	Heaton (1935)	1935	
Chenopodiaceae	<i>Krascheninnikovia lanata</i> var. <i>subspinosa</i>	<i>Eurotia lanata</i> , <i>Ceratoides lanata</i> var. <i>subspinosa</i> . Vars. not recognized in <i>Flora of North America</i> (2003).	shrubby winterfat	Shrub	Wide	Hist	?	Peebles 13079 (ARIZ)	1936	Type locality is near St. George, Washington Co., UT (Goodding 810 NY)
Chenopodiaceae	<i>Salsola tragus</i>	<i>S. kali</i> , <i>S. iberica</i> , <i>S. pestifer</i> , <i>S. australis</i>	Russian thistle	AnnF	Intro	Pres	Unc	Fertig 23676 (PISP)	1935	Native to Asia
Chenopodiaceae (Sarcobataceae)	<i>Sarcobatus vermiculatus</i>		greasewood	Shrub	Wide	Pres	Unc	Alexander 1226 (PISP)	1935	
Chenopodiaceae	<i>Suaeda torreyana</i> var. <i>torreyana</i>	<i>S. moquinii</i> , <i>S. nigra</i> , <i>S. fruticosa</i>	Torrey's seepweed	AnnF	Wide	Pres	Unc	Alexander 1252 (PISP)	2001	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Compositae (Asteraceae)	<i>Ambrosia acanthicarpa</i>	<i>Franeria acanthicarpa</i>	bur ragweed	AnnF	Wide	Pres	Unc	Alexander 1185 (PISP)	1935	
Compositae (Asteraceae)	<i>Ambrosia artemisifolia</i>	<i>A. artemisiifolia</i> var. <i>elator</i>	common ragweed	AnnF	Wide	Pres	Unc	Alexander 1186 (PISP)	1977	
Compositae (Asteraceae)	<i>Artemisia bigelovii</i>		Bigelow's sagebrush	Shrub	Wide	Pres	Unc	Alexander (1998b)	1977	Observed in field by J. Coles and W. Fertig, 2007
Compositae (Asteraceae)	<i>Artemisia campestris</i> var. <i>scouleriana</i>	<i>A. campestris</i> ssp. <i>pacifica</i> , <i>A.</i> <i>pacifica</i> , <i>Oligosporus</i> <i>campestris</i> ssp. <i>pacificus</i> , <i>O. pacificus</i>	sand wormwood	PerF	Wide	Rep	?	Alexander (1998b)	1998	Observed in field by J. Coles, 2007
Compositae (Asteraceae)	<i>Artemisia dracunculus</i> ssp. <i>glauca</i>	<i>Oligosporus</i> <i>dracunculus</i> ssp. <i>glauca</i> , <i>A.</i> <i>dracunculooides</i> . Var. not recognized in Cronquist (1994) and <i>Flora of North</i> <i>America</i> (2006)	tarragon	PerF	Wide	Rep	?	King (1977)	1977	
Compositae (Asteraceae)	<i>Artemisia filifolia</i>	<i>Oligosporus filifolius</i>	sand sagebrush	Shrub	Wide	Pres	Unc	Alexander 1257 (PISP)	1977	
Compositae (Asteraceae)	<i>Artemisia ludoviciana</i> var. <i>albula</i>	<i>A. ludoviciana</i> ssp. <i>albula</i>	Louisiana wormwood	PerF	Wide	Pres	Unc	Fertig 23681 (PISP)	1977	
Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>tridentata</i>	<i>Seriphidium</i> <i>tridentatum</i> ssp. <i>tridentatum</i>	basin big sagebrush	Shrub	Wide	Pres	Unc	Fertig 23674 (PISP)	2007	
Compositae (Asteraceae)	<i>Aster hesperius</i>	<i>A. coeruleus</i> , <i>A. lanceolatus</i> var. <i>hesperius</i> , <i>Symphotrichum</i> <i>lanceolatum</i> var. <i>hesperium</i>	Siskiyou aster	PerF	Wide	Pres	Rare	Alexander 1240 (PISP)	2001	
Compositae (Asteraceae)	<i>Chaenactis carphoclinia</i>	<i>C. carphoclinia</i> var. <i>carphoclinia</i>	Gray's chaenactis	AnnF	Wide	Pres	Unc	Louie & Evensen PISP- 10 (PISP)	1937	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Compositae (Asteraceae)	<i>Chaetopappa ericoides</i>	<i>Leucelene ericoides</i> , <i>Aster arenosus</i>	rose-heath	PerF	Wide	Pres	Unc	Alexander 1207 (PISP)	1939	
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>consimilis</i>	<i>Ericameria nauseosa</i> var. <i>consimilis</i> , <i>E. nauseosa</i> var. <i>oreophila</i> , <i>C.</i> <i>nauseosus</i> var. <i>oreophilus</i>	greenish rabbitbrush	Shrub	Wide	Pres	Com	Alexander 1219 (PISP)	1998	
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>gnaphalodes</i>	<i>C. nauseosus</i> var. <i>hololeucus</i> , <i>Ericameria nauseosa</i> var. <i>hololeuca</i>	graystem rabbitbrush	Shrub	Wide	Pres	Unc	Fertig 23665 (PISP)	2007	
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>graveolens</i>	<i>Ericameria nauseosa</i> var. <i>graveolens</i> , <i>E. nauseosa</i> var. <i>glabrata</i>	glabrate rabbitbrush	Shrub	Wide	Rep	?	Alexander (1998b)	1998	
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>junceus</i>	<i>Ericameria nauseosa</i> var. <i>junceus</i>	rush rabbitbrush	Shrub	RegEn	Pres	Unc	Fertig 23678 (PISP)	2007	
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>puberulus</i>	<i>Chrysothamnus viscidiflorus</i> ssp. <i>puberulus</i>	puberulent rabbitbrush	Shrub	Wide	Pres	Unc	Alexander 1193 (PISP)	2001	
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>stenophyllus</i>	Included in var. <i>viscidiflorus</i> by some authors. Var. not recognized in <i>Flora</i> of <i>North America</i> (2006).	slenderleaf rabbitbrush	Shrub	Wide	Pres	Com	Alexander 1247 (PISP)	1998	
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>viscidiflorus</i>		green rabbitbrush	Shrub	Wide	Rep	?	King (1977)	1977	
Compositae (Asteraceae)	<i>Conyza canadensis</i> var. <i>glabrata</i>	<i>Erigeron canadensis</i> , Vars. not recognized in <i>Flora of North</i> <i>America</i> (2006)	Canadian horseweed	AnnF	Wide	Rep	?	Heaton (1935)	1935	
Compositae (Asteraceae)	<i>Erigeron divergens</i> var. <i>divergens</i>	<i>E. divergens</i>	spreading daisy	PerF	Wide	Pres	Unc	Heaton s.n. (PISP)	1936	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Compositae (Asteraceae)	<i>Erigeron pumilus</i> var. <i>concinus</i>	<i>E. concinnus</i> var. <i>concinus</i> . Includes var. <i>subglaber</i>	Navajo fleabane	PerF	Periph	Rep	?	Alexander (1998b)	1998	
Compositae (Asteraceae)	<i>Gaillardia arizonica</i>		Arizona blanketflower	AnnF	RegEn	Rep	?	Alexander (1998b)	1998	
Compositae (Asteraceae)	<i>Gaillardia pinnatifida</i>		Hopi blanketflower	PerF	Wide	Pres	Unc	Alexander 1208 (PISP)	2001	
Compositae (Asteraceae)	<i>Grindelia squarrosa</i> var. <i>serrulata</i>	Vars. not recognized in <i>Flora of North America</i> (2006)	curlycup gumweed	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Compositae (Asteraceae)	<i>Gutierrezia</i> <i>microcephala</i>	Includes <i>G. lucida</i>	thread snakeweed	Shrub	Wide	Pres	Unc	Alexander 1198 (PISP)	1935	
Compositae (Asteraceae)	<i>Gutierrezia sarothrae</i>		broom snakeweed	Shrub	Wide	Pres	Com	Alexander 1258 (PISP)	2001	
Compositae (Asteraceae)	<i>Helianthus annuus</i> ssp. <i>lenticularis</i>	<i>H. aridus</i> ; ssp. not recognized in <i>Flora of North America</i> (2006)	common sunflower	AnnF	Wide	Pres	Unc	Alexander 1197 (PISP)	1935	
Compositae (Asteraceae)	<i>Hymenopappus</i> <i>filifolius</i> var. <i>cinereus</i>	<i>H. lugens</i> , <i>H. filifolius</i> var. <i>lugens</i> , <i>H. filifolius</i> var. <i>pauciflorus</i> , <i>H. filifolius</i> var. <i>megacephalus</i> , <i>H. filifolius</i> var. <i>tomentosus</i>	common hyalineherb	PerF	Wide	Pres	Unc	Alexander 1202 (PISP)	1998	
Compositae (Asteraceae)	<i>Iva axillaris</i>	<i>I. axillaris</i> var. <i>axillaris</i> . Vars. not recognized in <i>Flora of North America</i> (2006).	povertyweed	PerF	Wide	Pres	Unc	Alexander 1217 (PISP)	1998	
Compositae (Asteraceae)	<i>Lactuca serriola</i>		prickly lettuce	AnnF	Intro	Pres	Unc	Fertig 23690 (PISP)	1935	Native to Europe
Compositae (Asteraceae)	<i>Layia glandulosa</i>		tidytips	AnnF	Wide	Pres	Unc	Louie & Evdenden PISP 8 (PISP)	2001	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
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	Evenden & Louie PISP 31 (PISP)	1936	
Compositae (Asteraceae)	<i>Machaeranthera tanacetifolia</i>	<i>Aster tanacetifolius</i>	tansyleaf aster	AnnF	Wide	Pres	Unc	Alexander 1215 (PISP)	1998	
Compositae (Asteraceae)	<i>Malacothrix glabrata</i>	<i>M. californica</i> var. <i>glabrata</i>	filiform desert- dandelion	AnnF	Wide	Pres	Unc	Evenden & Louie PISP 27 (PISP)	2001	
Compositae (Asteraceae)	<i>Malacothrix sonchoides</i>		sowthistle desert- dandelion	AnnF	Wide	Hist	?	Heaton 3 (PISP)	1937	
Compositae (Asteraceae)	<i>Onopordum acanthium</i>	<i>O. acanthium</i> var. <i>acanthium</i>	Scotch thistle	PerF	Intro	Rep	?	Alexander (1998b)	1998	AZ state prohibited and restricted noxious weed. Native to Eurasia
Compositae (Asteraceae)	<i>Psilostrophe sparsiflora</i>		greenstem paperflower	PerF	RegEn	Hist	?	Heaton s.n. (PISP)	1936	Type locality is "Southern Utah" (Thompson s.n. GH)
Compositae (Asteraceae)	<i>Senecio douglasii</i> var. <i>longilobus</i>	<i>S. longilobus</i> , <i>S. flaccidus</i> var. <i>flaccidus</i> , <i>S. flaccidus</i> var. <i>douglasii</i>	Douglas' groundsel	PerF	Wide	Pres	Unc	Whitehead s.n. (PISP)	1935	
Compositae (Asteraceae)	<i>Solidago</i> sp.		goldenrod	PerF	Wide	Rep	?	Alexander (1998b)	1998	Identification needed
Compositae (Asteraceae)	<i>Sonchus asper</i>		spinyleaf sowthistle	AnnF	Intro	Pres	Unc	Evenden & Louie PISP 35 (PISP)	1997	Native to Europe
Compositae (Asteraceae)	<i>Sonchus oleraceus</i>		common sowthistle	AnnF	Intro	Rep	?	Alexander (1998b)	1998	Native to Europe
Compositae (Asteraceae)	<i>Stephanomeria exigua</i>	<i>S. exigua</i> ssp. <i>exigua</i>	white-plume wire lettuce	AnnF	Wide	Pres	Unc	Alexander 1199 (PISP)	2001	
Compositae (Asteraceae)	<i>Stephanomeria pauciflora</i>		brown-plume wire lettuce	PerF	Wide	Pres	Unc	Fertig 23668 (PISP)	1998	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Compositae (Asteraceae)	<i>Thelesperma subnudum</i> var. <i>subnudum</i>	Vars. not recognized in <i>Flora of North America</i> (2006)	scapose greenthread	PerF	Wide	Pres	Unc	Alexander 1204 (PISP)	1937	Type locality is "Southern Utah" (Parry 109 GH)
Compositae (Asteraceae)	<i>Townsendia incana</i>		hoary townsendia	PerF	Wide	Pres	Unc	Louie & Evenden PISP 19 (PISP)	2001	
Compositae (Asteraceae)	<i>Tragopogon dubius</i>	<i>T. dubius</i> var. <i>major</i>	yellow salsify	PerF	Intro	Pres	Unc	Evenden & Louie PISP 28 (PISP)	1997	Native to Europe
Compositae (Asteraceae)	<i>Verbesina encelioides</i> var. <i>exauriculata</i>	<i>Ximenesia encelioides</i>	golden crownbeard	AnnF	Wide	Pres	Unc	Alexander 1188 (PISP)	1935	
Compositae (Asteraceae)	<i>Xanthium strumarium</i> var. <i>canadense</i>	<i>X. pensylvanicum</i> , <i>X. saccharatum</i> . Vars. not recognized in <i>Flora of North America</i> (2006).	rough cocklebur	AnnF	Wide	Rep	?	Heaton (1935) & King (1977)	1935	
Convulvaceae	<i>Convolvulus arvensis</i>		field bindweed	PerF	Intro	Hist	?	Parker 6238 (ARIZ)	1946	AZ state prohibited and regulated noxious weed. Native to Eurasia
Cruciferae (Brassicaceae)	<i>Arabis perennans</i> var. <i>perennans</i>	<i>Boechea perennans</i>	perennial rockcress	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Cruciferae (Brassicaceae)	<i>Capsella bursa-pastoris</i>		shepherd's-purse	AnnF	Intro	Hist	?	Heaton 17 (PISP)	1937	Native to Europe
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>glabra</i>		western tansymustard	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1935	
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>intermedia</i>	Included in <i>D. pinnata</i> var. <i>osmiarum</i> by some authors	western tansymustard	AnnF	Periph	Hist	?	Heaton 1941-1 (PISP)	1939	
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>osmiarum</i>	<i>D. pinnata</i> ssp. <i>halictorum</i>	western tansymustard	AnnF	Wide	Pres	Unc	Heaton 1941-2 (PISP)	1941	
Cruciferae (Brassicaceae)	<i>Descurainia sophia</i>		flixweed	AnnF	Intro	Pres	Unc	Nelson 9304 (RM)	1971	Native to Europe
Cruciferae (Brassicaceae)	<i>Dithyrea wislizeni</i>	<i>Dimorphocarpa wislizeni</i>	spectaclepod	AnnF	Wide	Pres	Unc	Heaton s.n. (PISP)	1936	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Cruciferae (Brassicaceae)	<i>Erysimum repandum</i>		spreading wallflower	AnnF	Intro	Hist	?	Heaton s.n. (PISP)	1939	Native to Europe
Cruciferae (Brassicaceae)	<i>Lepidium densiflorum</i> var. <i>ramosum</i>	Includes var. <i>macrocarpum</i>	prairie pepperwort	AnnF	Periph	Hist	?	Heaton s.n. (PISP)	1936	
Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>jonesii</i>		Jones' pepperwort	PerF	Wide	Pres	Com	Heaton s.n. (PISP)	1937	Type locality is St. George, Washington Co., UT (Jones 1636 NY)
Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>stellae</i>	<i>L. montanum</i> var. <i>cinereum</i>	Stella's pepperwort	PerF	LocEn	Hist	?	Heaton 1941- 17 (PISP)	1941	Type locality is SE of Cannonville, Kane Co., UT (Reveal & Reveal 4454 BRY)
Cruciferae (Brassicaceae)	<i>Lepidium perfoliatum</i>		clasping pepperwort	AnnF	Intro	Hist	?	Lehto 7172 (ARIZ)	1966	Native to Europe
Cruciferae (Brassicaceae)	<i>Nasturtium officinale</i>	<i>Rorippa nasturtium- aquaticum</i>	watercress	PerF	Intro	Pres	Unc	Fertig 23692 (PISP)	1997	Native to Europe
Cruciferae (Brassicaceae)	<i>Sisymbrium altissimum</i>		tumble mustard	AnnF	Intro	Pres	Unc	Heaton 1941- 11 (PISP)	1941	Native to Europe
Cruciferae (Brassicaceae)	<i>Stanleya pinnata</i>	<i>S. pinnata</i> var. <i>pinnata</i>	prince's-plume	PerF	Wide	Pres	Unc	Evenden & Louie PISP 3 (PISP)	1939	
Cruciferae (Brassicaceae)	<i>Streptanthella longirostris</i>		long-beak fiddle mustard	AnnF	Wide	Hist	?	Heaton 18 (PISP)	1937	
Cucurbitaceae	<i>Cucurbita foetidissima</i>		buffalo gourd	PerF	Wide	Pres	Unc	Alexander 1218 (PISP)	1935	
Cupressaceae	<i>Juniperus osteosperma</i>	<i>Sabina osteosperma</i>	Utah juniper	Shrub	Wide	Pres	Unc	Alexander 1246 (PISP)	1935	
Cupressaceae	<i>Juniperus scopulorum</i>	<i>Sabina scopulorum</i>	Rocky Mountain juniper	Tree	Wide	Rep	?	Alexander (1998b)	1998	
Cyperaceae	<i>Carex nebrascensis</i>	<i>C. nebrascensis</i>	Nebraska sedge	PerG	Wide	Pres	Rare	Alexander 1244 (PISP)	1998	
Cyperaceae	<i>Carex praegracilis</i>		blackcreeper sedge	PerG	Wide	Pres	Rare	Heaton s.n. (PISP)	1938	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Cyperaceae	<i>Cyperus</i> sp.		flat-sedge	AnnF	Intro	Rep	?	Alexander (1998b)	1998	Identification needed
Cyperaceae	<i>Eleocharis parishii</i>		Parish's spikerush	PerG	Wide	Pres	Rare	Alexander 1242 (PISP)	1998	
Cyperaceae	<i>Scirpus pungens</i> var. <i>longispicatus</i>	<i>Scirpus pungens</i> var. <i>polyphyllus</i> , <i>Scirpus americanus</i> var. <i>longispicatus</i> , <i>Schoenoplectus</i> <i>pungens</i> var. <i>longispicatus</i> , <i>Schoenoplectus</i> <i>pungens</i> var. <i>polyphyllus</i>	three-square bulrush	PerG	Wide	Pres	Rare	Alexander 1243 (PISP)	1998	
Elaeagnaceae	<i>Shepherdia rotundifolia</i>		roundleaf buffaloberry	Shrub	RegEn	Pres	Unc	Fertig 23667 (PISP)	1977	Type locality is upper valley of the Virgin, Kane Co., UT (Siler s.n. ISC)
Ephedraceae	<i>Ephedra torreyana</i>		Torrey's ephedra	Shrub	Wide	Pres	Rare	Fertig 23669 (PISP)	2007	
Ephedraceae	<i>Ephedra viridis</i> var. <i>viridis</i>	<i>E. viridis</i>	green ephedra	Shrub	Wide	Pres	Unc	Alexander 1201 (PISP)	1977	
Ephedraceae	<i>Ephedra viridis</i> var. <i>viscida</i>	<i>E. cutleri</i>	Cutler's ephedra	Shrub	RegEn	Pres	Unc	Ganz s.n. (ARIZ)	1965	Observed vegetatively by Fertig, 2007
Euphorbiaceae	<i>Chamaesyce albomarginata</i>	<i>Euphorbia albomarginata</i>	rattlesnake- weed	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Euphorbiaceae	<i>Chamaesyce fendleri</i>	<i>Euphorbia fendleri</i>	Fendler's spurge	PerF	Wide	Pres	Unc	Alexander 1203 (PISP)	1939	
Euphorbiaceae	<i>Chamaesyce glyptosperma</i>	<i>Euphorbia glyptosperma</i>	ridge-seeded spurge	AnnF	Wide	Pres	Com	Heaton s.n. (PISP)	1936	
Euphorbiaceae	<i>Chamaesyce prostrata</i>	<i>Euphorbia prostrata</i> , <i>E. chamaesyce</i>	prostrate spurge	AnnF	Intro	Pres	Unc	Fertig 23691 (PISP)	2007	Native to eastern North America
Fagaceae	<i>Quercus turbinella</i>		turbinella live- oak	Shrub	Wide	Pres	Unc	Alexander 1249 (PISP)	1935	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Fumariaceae	<i>Corydalis aurea</i> var. <i>occidentalis</i>	<i>C. curvilliqua</i> sp. <i>occidentalis</i>	golden corydalis	PerF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Gentianaceae	<i>Swertia albomarginata</i>	<i>Frasera albomarginata</i>	white-margined swertia	PerF	Wide	Hist	?	Peebles 13080 (ARIZ)	1936	Type locality is near St. George, Washington Co., UT (Palmer s.n. US)
Gentianaceae	<i>Swertia utahensis</i>	<i>Frasera paniculata</i>	Utah swertia	PerF	RegEn	Rep	?	Alexander (1998b)	1998	Type locality is Buckskin Mtns, Kaibab Plateau "on the southern edge of Utah", Kane Co., UT (Jones s.n. POM)
Geraniaceae	<i>Erodium cicutarium</i>		stork's-bill	AnnF	Intro	Pres	Com	Alexander 1213 (PISP)	1997	Native to Europe
Gramineae (Poaceae)	<i>Agropyron cristatum</i>	<i>A. cristatum</i> sp. <i>cristatum</i> , <i>A. cristatum</i> sp. <i>pectinatum</i> , <i>A. pectinatum</i> , <i>A. sibiricum</i> , <i>A. fragile</i> , <i>A. mongolicum</i> , <i>A. desertorum</i>	crested wheatgrass	PerG	Intro	Rep	?	King (1977)	1977	Native to Eurasia
Gramineae (Poaceae)	<i>Agrostis stolonifera</i>	<i>A. alba</i> , <i>A. gigantea</i>	redtop	PerG	Intro	Pres	Unc	Alexander 1241 (PISP)	1998	Native to Eurasia and Africa
Gramineae (Poaceae)	<i>Aristida purpurea</i>	<i>A. glauca</i> , <i>A. purpurea</i> var. <i>fendleriana</i> , <i>A. fendleriana</i> , <i>A. purpurea</i> var. <i>longiseta</i>	purple three- awn	PerG	Wide	Pres	Com	Alexander 1210 (PISP)	1941	
Gramineae (Poaceae)	<i>Bouteloua barbata</i>	<i>Chondrosom barbatum</i> . Includes vars. <i>barbata</i> & <i>rothrockii</i>	sixweeks grama	AnnG	Wide	Pres	Unc	Fertig 23671 (PISP)	1935	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Gramineae (Poaceae)	<i>Bouteloua curtipendula</i>	Includes vars. <i>curtipendula</i> & <i>caespitosa</i>	sideoats grama	PerG	Wide	Rep	?	King (1977)	1977	
Gramineae (Poaceae)	<i>Bouteloua eriopoda</i>	<i>Chondrosium eripodum</i>	black grama	PerG	Wide	Pres	Unc	Alexander 1250 (PISP)	1977	
Gramineae (Poaceae)	<i>Bouteloua gracilis</i>	<i>Chondrosium gracile</i>	blue grama	PerG	Wide	Pres	Unc	Purchase 272 (ARIZ)	1936	
Gramineae (Poaceae)	<i>Bromus diandrus</i>	<i>B. rigidus, Anisantha diandra</i>	ripgut brome	AnnG	Intro	Pres	Unc	Louie & Evensen PISP 22 (PISP)	1977	Native to Eurasia
Gramineae (Poaceae)	<i>Bromus inermis</i> var. <i>inermis</i>	<i>Bromopsis inermis,</i> <i>Bromus inermis</i>	smooth brome	PerG	Intro	Rep	?	King (1977)	1977	Native to Eurasia
Gramineae (Poaceae)	<i>Bromus rubens</i>		red brome	AnnG	Intro	Pres	Com	Louie & Evensen PISP 34 (PISP)	1998	Native to Eurasia
Gramineae (Poaceae)	<i>Bromus tectorum</i>	<i>Anisantha tectorum</i>	cheatgrass	AnnG	Intro	Pres	Com	Heaton 1941- 14 (PISP)	1938	Native to Eurasia
Gramineae (Poaceae)	<i>Cenchrus longispinus</i>	<i>C. pauciflorus</i>	field sandbur	AnnG	Wide	Rep	?	Kurth (1998)	1997	
Gramineae (Poaceae)	<i>Distichlis spicata</i>	<i>D. spicata</i> var. <i>stricta,</i> <i>D. stricta</i>	desert saltgrass	PerG	Wide	Rep	?	King (1977), Alexander (1998b)	1977	
Gramineae (Poaceae)	<i>Echinochloa crus-galli</i>	Includes <i>E. microstachya,</i> <i>E. muricata</i> var. <i>microstachya</i>	barnyard-grass	AnnG	Intro	Rep	?	Alexander (1998b)	1998	Native to Eurasia
Gramineae (Poaceae)	<i>Elymus elongatus</i>	<i>E. elongatus</i> var. <i>ponticus, Agropyron elongatum, Thinopyrum ponticum</i>	tall wheatgrass	PerG	Intro	Rep	?	Kurth (1998)	1997	Native to Eurasia
Gramineae (Poaceae)	<i>Elymus elymoides</i>	<i>Sitanion hystrix,</i> <i>E. elymoides</i> var. <i>elymoides</i>	squirreltail	PerG	Wide	Rep	?	King (1977), Alexander (1998b)	1977	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Gramineae (Poaceae)	<i>Elymus hispidus</i>	<i>Agropyron intermedium</i> , <i>Elytrigia intermedia</i> , <i>E. hispidus</i> var. <i>hispidus</i> , <i>Thinopyrum intermedium</i>	intermediate wheatgrass	PerG	Intro	Rep	?	King (1977)	1977	Native to Eurasia
Gramineae (Poaceae)	<i>Elymus smithii</i>	<i>Agropyron smithii</i> , <i>Pascopyrum smithii</i> ; includes vars. <i>smithii</i> & <i>palmeri</i>	western wheatgrass	PerG	Wide	Rep	?	King (1977), Alexander (1998b)	1977	
Gramineae (Poaceae)	<i>Elymus trachycaulus</i>	<i>E. trachycaulus</i> var. <i>trachycaulus</i> , <i>E. alaskanus</i> ssp. <i>latiglumis</i> , <i>Agropyron caninum</i> , <i>A. subsecundum</i> , <i>A. trachycaulum</i> , <i>A. latiglume</i>	slender wheatgrass	PerG	Wide	Hist	?	Heaton s.n. (PISP)	1938	
Gramineae (Poaceae)	<i>Eragrostis cilianensis</i>		stinkgrass	AnnG	Intro	Rep	?	King (1977)	1977	Native to Eurasia
Gramineae (Poaceae)	<i>Eragrostis mexicana</i>	<i>E. orcuttiana</i>	Mexican lovegrass	AnnG	Intro	Rep	?	Alexander (1998b)	1998	Native to western North America
Gramineae (Poaceae)	<i>Eragrostis pectinacea</i>	<i>E. diffusa</i>	tufted lovegrass	AnnG	Wide	Pres	Unc	Fertig 23682 (PISP)	1977	
Gramineae (Poaceae)	<i>Erioneuron pulchellum</i>	<i>Dasyochloa pulchella</i> , <i>Tridens pulchellus</i>	fluffgrass	PerG	Wide	Rep	?	Heaton (1935)	1935	
Gramineae (Poaceae)	<i>Festuca arundinacea</i>	<i>Schedonorus phoenix</i> , <i>S. arundinaceus</i> , <i>Lolium arundinaceum</i>	tall fescue	PerG	Intro	Rep	?	King (1977), Alexander (1998b)	1977	Native to Europe
Gramineae (Poaceae)	<i>Hilaria jamesii</i>	<i>Pleuraphis jamesii</i>	galleta	PerG	Wide	Pres	Unc	Alexander 1209 (PISP)	1936	
Gramineae (Poaceae)	<i>Hordeum jubatum</i>	<i>Critesion jubatum</i>	foxtail barley	PerG	Wide	Rep	?	King (1977)	1977	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Gramineae (Poaceae)	<i>Hordeum murinum</i>	<i>H. leporinum</i> , <i>H. murinum</i> ssp. <i>leporinum</i> , <i>Critesion glaucum</i>	rabbit barley	AnnG	Intro	Pres	Unc	Heaton 1941-3 (PISP)	1938	
Gramineae (Poaceae)	<i>Muhlenbergia asperifolia</i>		scratchgrass	PerG	Wide	Pres	Unc	Alexander 1223 (PISP)	1977	
Gramineae (Poaceae)	<i>Muhlenbergia porteri</i>		bush muhly	PerG	Wide	Pres	Unc	Fertig 23680 (PISP)	1977	
Gramineae (Poaceae)	<i>Munroa squarrosa</i>	<i>Monroa squarrosa</i>	false buffalograss	AnnG	Wide	Pres	Rare	Fertig 23670 (PISP)	2007	
Gramineae (Poaceae)	<i>Poa fendleriana</i>	<i>P. longiligula</i> , <i>P. fendleriana</i> ssp. <i>longiligula</i>	muttongrass	PerG	Wide	Rep	?	Alexander (1998b)	1998	
Gramineae (Poaceae)	<i>Poa pratensis</i>	<i>Poa agassizensis</i>	Kentucky bluegrass	PerG	Intro	Rep	?	King (1977), Alexander (1998b)	1977	Native to Europe
Gramineae (Poaceae)	<i>Polygona mospeliensis</i>		rabbitsfoot- grass	AnnG	Intro	Pres	Unc	Fertig 23686 (PISP)	1998	Native to Eurasia and Africa
Gramineae (Poaceae)	<i>Polygona semiverticillata</i>	<i>Agrostis semiverticillata</i> , <i>P. viridis</i>	water polypogon	PerG	Intro	Rep	?	Alexander (1998b)	1998	Native to Eurasia and Africa
Gramineae (Poaceae)	<i>Sporobolus airoides var. airoides</i>	<i>S. airoides</i>	alkali sacaton	PerG	Wide	Rep	?	King (1977), Alexander (1998b)	1977	
Gramineae (Poaceae)	<i>Sporobolus contractus</i>		spike dropseed	PerG	Wide	Pres	Unc	Alexander 1221 (PISP)	1936	
Gramineae (Poaceae)	<i>Sporobolus cryptandrus</i>		sand dropseed	PerG	Wide	Pres	Unc	Purchase 271 (ARIZ)	1936	
Gramineae (Poaceae)	<i>Sporobolus flexuosus</i>		mesa dropseed	PerG	Wide	Pres	Unc	Alexander 1220 (PISP)	1977	
Gramineae (Poaceae)	<i>Stipa comata</i> var. <i>comata</i>	<i>Hesperostipa comata var. comata</i>	needle-and- thread	PerG	Wide	Pres	Unc	Louie & Eviden PISP 28 (PISP)	1977	
Gramineae (Poaceae)	<i>Stipa hymenoides</i>	<i>Oryzopsis hymenoides</i> , <i>Achnatherum hymenoides</i>	Indian ricegrass	PerG	Wide	Pres	Unc	King (1977)	1977	Observed vegetatively by Fertig, 2007

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Gramineae (Poaceae)	<i>Stipa speciosa</i>	<i>Achnatherum speciosum</i> , <i>Jarava speciosum</i>	desert needlegrass	PerG	Wide	Pres	Unc	Louie & Evensden PISP 23 (PISP)	1977	
Hydrophyllaceae	<i>Phacelia crenulata</i> var. <i>corrugata</i>	<i>P. corrugata</i>	corrugate phacelia	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1937	
Hydrophyllaceae	<i>Phacelia crenulata</i> var. <i>crenulata</i>	<i>P. crenulata</i>	crenulate phacelia	AnnF	Wide	Pres	Unc	Louie & Evensden PISP 6 (PISP)	2001	
Hydrophyllaceae	<i>Phacelia ivesiana</i>		Ives' phacelia	AnnF	Wide	Pres	Unc	Louie & Evensden PISP 12 (PISP)	1937	
Hydrophyllaceae	<i>Phacelia pulchella</i> var. <i>gooddingii</i>		Goodding's pretty phacelia	AnnF	RegEn	Hist	?	Heaton 7 (PISP)	1937	
Iridaceae	<i>Sisyrinchium demissum</i>		blue-eyed grass	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Juncaceae	<i>Juncus arcticus</i>	<i>J. balticus</i> var. <i>montanus</i> , <i>J. arcticus</i> var. <i>balticus</i> , <i>J. arcticus</i> ssp. <i>ater</i> ; includes var. <i>mexicanus</i>	Baltic rush	PerG	Wide	Pres	Unc	Evensden & Louie 33 (PISP)	1998	
Juncaceae	<i>Juncus ensifolius</i> var. <i>brunnescens</i>	<i>J. saximontanus</i> forma <i>brunnescens</i> . Included in <i>J. ensifolius</i> var. <i>montanus</i> by some authors	Tracy's rush	PerG	Wide	Hist	?	Heaton s.n. (PISP)	1938	
Juncaceae	<i>Juncus torreyi</i>		Torrey's rush	PerG	Wide	Pres	Unc	Fertig 23693 (PISP)	1998	
Labiatae (Lamiaceae)	<i>Marrubium vulgare</i>		common horehound	PerF	Intro	Pres	Unc	Alexander 1235 (PISP)	1935	Native to Eurasia
Labiatae (Lamiaceae)	<i>Mentha spicata</i>		spearmint	PerF	Intro	Pres	Rare	Alexander 1190 (PISP)	1998	Native to Europe
Labiatae (Lamiaceae)	<i>Salvia dorrii</i> sp. <i>dorrii</i>	<i>S. carnosa</i>	Dorr's sage	Shrub	Wide	Pres	Unc	Heaton 1 (PISP)	1937	
Leguminosae (Fabaceae)	<i>Astragalus amphioxys</i> var. <i>vespertinus</i>		Sheldon's milkvetch	PerF	RegEn	Hist	?	Heaton s.n. (PISP)	1934	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Leguminosae (Fabaceae)	<i>Astragalus ceramicus</i> var. <i>ceramicus</i>		painted milkvetch	PerF	Wide	Pres	Unc	Evenden & Louie PISP 21 (PISP)	1998	
Leguminosae (Fabaceae)	<i>Astragalus praelongus</i> var. <i>praelongus</i>		stinking milkvetch	PerF	Wide	Rep	?	Alexander & Decker 1444 (PISP)	1998	
Leguminosae (Fabaceae)	<i>Glycyrrhiza lepidota</i>	<i>G. lepidota</i> var. <i>lepidota</i>	Nuttall's licorice	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Leguminosae (Fabaceae)	<i>Lupinus pusillus</i> var. <i>pusillus</i>	<i>L. pusillus</i> ssp. <i>pusillus</i>	dwarf lupine	AnnF	Wide	Hist	?	Heaton 2 (PISP)	1937	
Leguminosae (Fabaceae)	<i>Medicago sativa</i>	<i>M. sativa</i> ssp. <i>sativa</i>	alfalfa	PerF	Intro	Rep	?	Kurth (1998)	1997	Native to Europe
Leguminosae (Fabaceae)	<i>Melilotus alba</i>	<i>M. albus</i> , included in <i>M. officinalis</i> by some authors	white sweetclover	AnnF	Intro	Rep	?	King (1977), Alexander (1998b)	1977	Native to Europe
Leguminosae (Fabaceae)	<i>Melilotus officinalis</i>		yellow sweetclover	PerF	Intro	Rep	?	Alexander (1998b)	1998	Native to Europe
Leguminosae (Fabaceae)	<i>Peteria thompsoniae</i>		Thompson's peteria	PerF	RegEn	Pres	Rare	Alexander 1251 (PISP)	2001	Type locality is Kanab, Kane Co., UT (Thompson s.n. GH)
Leguminosae (Fabaceae)	<i>Robinia pseudoacacia</i>		black locust	Tree	Intro	Pres	Unc	Alexander 1256 (PISP)	1998	Native to eastern North America
Liliaceae (Themidaceae)	<i>Androstephium</i> <i>breviflorum</i>	<i>Brodiaea paysonii</i>	pink funnel-lily	PerF	Wide	Hist	?	Peebles 13078 (Univ Arizona)	1936	Type locality is near Kanab, Kane Co., UT (Thompson s.n.)
Liliaceae (Calochortaceae)	<i>Calochortus flexuosus</i>		sinuous mariposa	PerF	Wide	Pres	Unc	Louie & Evenden PISP 1 (PISP)	1935	Type locality is near Kanab, Kane Co., UT (Thompson s.n. GH)
Linaceae	<i>Linum aristatum</i>	<i>Mesynium aristatum</i>	broomflax	AnnF	Wide	Pres	Unc	Fertig 23675 (PISP)	1998	
Loasaceae	<i>Mentzelia albicaulis</i>	<i>M. obscura</i> , <i>Acroloasia</i> <i>albicaulis</i> , <i>A. gracilis</i>	white-stem blazingstar	AnnF	Wide	Pres	Unc	Evenden & Louie PISP 17 (PISP)	1937	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Loasaceae	<i>Mentzelia integra</i>	<i>M. multiflora</i> var. <i>integra</i> , <i>M. pumila</i> var. <i>integra</i>	Virgin stickleaf	PerF	Wide	Hist	?	Lehto 7037 (ARIZ)	1966	Type locality is Rockville, Washington Co., UT (Jones 6082c)
Loasaceae	<i>Mentzelia multiflora</i>	<i>M. pumila</i> var. <i>multiflora</i> , <i>M.</i> <i>multiflora</i> var. <i>multiflora</i> , <i>Nuttallia</i> <i>multiflora</i>	desert stickleaf	PerF	Wide	Pres	Unc	Alexander 1214 (PISP)	1998	
Malvaceae	<i>Althaea rosea</i>	<i>Alcea rosea</i>	hollyhock	PerF	Intro	Rep	?	Kurth (1998)	1997	Native to China
Malvaceae	<i>Malva neglecta</i>		common mallow	AnnF	Intro	Pres	Com	Alexander 1231 (PISP)	1997	Native to Eurasia
Malvaceae	<i>Sphaeralcea ambigua</i> var. <i>ambigua</i>		Mohave globemallow	PerF	Wide	Pres	Unc	Alexander 1255 (PISP)	1935	
Malvaceae	<i>Sphaeralcea parvifolia</i>		small-leaf globemallow	PerF	Wide	Hist	?	Whitehead s.n. (PISP)	1936	
Nyctaginaceae	<i>Abronia fragrans</i>	<i>A. fragrans</i> var. <i>elliptica</i> , <i>A. nana</i> var. <i>harrisii</i> , includes <i>A.</i> <i>elliptica</i>	fragrant sand- verbena	PerF	Wide	Pres	Unc	Heaton 20 (PISP)	1937	Observed vegetatively by Fertig, 2007
Nyctaginaceae	<i>Mirabilis multiflora</i>	<i>M. multiflora</i> var. <i>multiflora</i> , <i>Quamoclidion</i> <i>multiflorum</i>	showy four- o'clock	PerF	Wide	Pres	Unc	Louie & Eviden PISP 18 (PISP)	1935	
Oleaceae	<i>Menodora scabra</i>		rough menodora	PerF	Wide	Pres	Unc	Alexander 1200 (PISP)	1998	
Onagraceae	<i>Camissonia chamaenerioides</i>	<i>Oenothera chamaenerioides</i>	slender-pod camissonia	AnnF	Wide	Pres	Unc	Eviden & Louie PISP 24 (PISP)	2001	
Onagraceae	<i>Camissonia parryi</i>	<i>Oenothera parryi</i>	Parry's camissonia	AnnF	RegEn	Hist	?	Heaton 25 (PISP)	1936	Type locality is near St. George, Washington Co., UT (Parry 72 GH)
Onagraceae	<i>Camissonia parvula</i>	<i>Oenothera contorta</i> var. <i>flexuosa</i>	tiny camissonia	AnnF	Periph	Hist	?	Heaton s.n. (PISP)	1936	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Onagraceae	<i>Epilobium ciliatum</i>	<i>E. ciliatum</i> var. <i>E. watsonii</i> , <i>E. adenocaulon</i>	northern willow-herb	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Onagraceae	<i>Gaura coccinea</i>		scarlet gaura	PerF	Wide	Hist	?	Heaton s.n. (PISP)	1939	
Onagraceae	<i>Gaura parviflora</i>	<i>G. mollis</i>	small-flowered gaura	AnnF	Wide	Pres	Unc	Alexander 1224 (PISP)	1998	
Onagraceae	<i>Oenothera albicaulis</i>		white-stem evening primrose	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Onagraceae	<i>Oenothera caespitosa</i> var. <i>navajoensis</i>		Paria evening primrose	PerF	RegEn	Pres	Unc	Evenden & Louie PISP 20 (PISP)	1998	Type locality is Paria River, Kane Co., UT (Cronquist 10202 MO)
Onagraceae	<i>Oenothera californica</i>		California evening primrose	PerF	Wide	Pres	Unc	Alexander 1205 (PISP)	2001	
Onagraceae	<i>Oenothera pallida</i> var. <i>pallida</i>	Includes var. <i>runcinata</i>	pale evening primrose	PerF	Wide	Pres	Unc	Alexander 1206 (PISP)	1936	
Onagraceae	<i>Oenothera primiveris</i> var. <i>bufonus</i>	<i>Oenothera primiveris</i>	early evening primrose	AnnF	RegEn	Rep	?	Alexander (1998b)	NA	
Orobanchaceae	<i>Orobanche ludoviciana</i>	<i>O. ludoviciana</i> var. <i>ludoviciana</i> , <i>O.</i> <i>cooperi</i> ; includes <i>O.</i> <i>multiflora</i> from <i>Utah Flora</i> (1993) and vars. <i>cooperi</i> & <i>araneosa</i>	Cooper's broomrape	PerF	Wide	Pres	Unc	Whitehead s.n. (PISP)	1935	
Papaveraceae	<i>Eschscholzia minutiflora</i>		pygmy golden- poppy	AnnF	Wide	Pres	Unc	Louie & Evenden PISP 5 (PISP)	1935	
Pinaceae	<i>Pinus edulis</i>		two-needle pinyon	Tree	Wide	Pres	Unc	Alexander 1248 (PISP)	1935	
Plantaginaceae	<i>Plantago lanceolata</i>		English plantain	PerF	Intro	Rep	?	Alexander (1998b)	1998	Native to Eurasia
Plantaginaceae	<i>Plantago major</i>	Includes var. <i>pachyphylla</i>	common plantain	PerF	Intro	Pres	Rare	Alexander 1189 (PISP)	1935	Mostly native to Europe

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Polemoniaceae	<i>Eriastrum eremicum</i>		Mohave eriastrum	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1941	
Polemoniaceae	<i>Gilia inconspicua</i>	Includes vars. <i>inconspicua</i> & <i>sinuata</i> , <i>G. ophthalmooides</i> , <i>G.</i> <i>sinuata</i> , <i>Gilia clokeyi</i>	shy gilia	AnnF	Wide	Pres	Unc	Even den & Louie PISP 13 (PISP)	1936	If recognized, plants from PISP represent vars. <i>inconspicua</i> and <i>sinuata</i>
Polemoniaceae	<i>Gilia leptomeria</i> var. <i>leptomeria</i>		common gilia	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1937	
Polemoniaceae	<i>Ipomopsis longiflora</i>		long-flowered gilia	PerF	Wide	Pres	Unc	Alexander 1211 (PISP)	1936	
Polemoniaceae	<i>Ipomopsis polycladon</i>		spreading gilia	AnnF	Wide	Hist	?	Heaton 30 (PISP)	1937	
Polemoniaceae	<i>Langloisia setosissima</i>		Mohave langloisia	AnnF	Wide	Hist	?	Heaton 21 (PISP)	1937	
Polygalaceae	<i>Polygala subspinosa</i>	<i>P. subspinosa</i> var. <i>subspinosa</i>	cushion milkwort	PerF	Wide	Hist	?	Heaton s.n. (PISP)	1939	
Polygonaceae	<i>Centrostegia thurberi</i>	<i>Chorizantha thurberi</i>	Thurber's spineflower	AnnF	Wide	Hist	?	Heaton 19 (PISP)	1937	
Polygonaceae	<i>Eriogonum cernuum</i> var. <i>cernuum</i>	Vars. not recognized in <i>Flora of North</i> <i>America</i> (2005)	nodding wild buckwheat	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Polygonaceae	<i>Eriogonum</i> <i>corymbosum</i> var. <i>aureum</i>	<i>E. aureum</i> , includes var. <i>glutinosum</i>	golden wild buckwheat	Shrub	RegEn	Rep	?	King (1977), Alexander (1998b)	1977	Type locality is St. George, Washington Co., UT (Jones 6091 POM). Considered a local endemic restricted to the Shivwits area of Washington Co. in <i>Flora of North</i> <i>America</i> (2005).

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Polygonaceae	<i>Eriogonum corymbosum</i> var. <i>corymbosum</i>	Includes vars. <i>velutinum</i> , <i>divaricatum</i> , <i>erectum</i> , & <i>davidse</i> and <i>E. lancifolium</i>	crisp-leaf wild buckwheat	Shrub	Wide	Pres	Unc	Alexander 1228 (PISP)	2001	
Polygonaceae	<i>Eriogonum deflexum</i>	<i>E. deflexum</i> var. <i>deflexum</i>	skeletonweed wild buckwheat	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1936	
Polygonaceae	<i>Eriogonum inflatum</i> var. <i>inflatum</i>	<i>E. inflatum</i>	desert trumpet	PerF	Wide	Pres	Unc	Evenden & Louie PISP 36 (PISP)	1935	
Polygonaceae	<i>Eriogonum microthecum</i> var. <i>simpsonii</i>	<i>E. simpsonii</i> , <i>E. microthecum</i> var. <i>foliosum</i> ; includes <i>E. phoeniceum</i>	slender wild buckwheat	PerF	Wide	Pres	Unc	Alexander 1227 (PISP)	1977	
Polygonaceae	<i>Eriogonum palmerianum</i>		Palmer's wild buckwheat	AnnF	Wide	Pres	Unc	Louie & Evenden PISP 7 (PISP)	2001	
Polygonaceae	<i>Polygonum amphibium</i>	<i>P. amphibium</i> var. <i>emersum</i> , <i>P. coccineum</i> , <i>Persicaria coccinea</i> , <i>Persicaria amphibia</i>	water smartweed	PerF	Wide	Rep	?	Heaton (1935)	1935	
Polygonaceae	<i>Polygonum aviculare</i>	<i>P. arenastrum</i> , <i>P. aviculare</i> ssp. <i>aviculare</i>	yard knotweed	AnnF	Intro	Pres	Unc	Alexander 1230 (PISP)	1998	Native to Eurasia. PISP specimen is " <i>arenastrum</i> " phase.
Polygonaceae	<i>Rumex crispus</i>		curly dock	PerF	Intro	Rep	?	Kurth (1998)	1997	Native to Eurasia
Polygonaceae	<i>Rumex hymenosepalus</i>		canaigre dock	PerF	Wide	Pres	Unc	Fertig 23672 (PISP)	1998	
Portulacaceae	<i>Portulaca oleracea</i>		common purslane	AnnF	Intro	Pres	Com	Fertig 23663 (PISP)	1998	AZ state prohibited and regulated noxious weed. Native to eastern North America
Ranunculaceae (Helleboraceae)	<i>Delphinium andersonii</i> var. <i>scaposum</i>		pale larkspur	PerF	Wide	Hist	?	Peebles 13077 (ARIZ)	1936	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Rosaceae	<i>Amelanchier utahensis</i>		Utah serviceberry	Shrub	Wide	Pres	Unc	Nelson 9308 (RM)	1971	Type locality is Toquerville, Washington Co., UT (Jones 1716 GH)
Rosaceae	<i>Fallugia paradoxa</i>		Apache plume	Shrub	Wide	Pres	Unc	Louie & Evenden PISP 38 (PISP)	1936	
Rosaceae	<i>Potentilla gracilis</i> var. <i>elmeri</i>	<i>P. pectinisetta</i>	comb-leaf cinquefoil	Perf	Wide	Hist	?	Heaton s.n. (PISP)	1939	
Rosaceae	<i>Prunus americana</i>		American plum	Shrub	Intro	Pres	Unc	Fertig 23689 (PISP)	1998	Native to central North America
Rosaceae	<i>Purshia mexicana</i> var. <i>stansburyana</i>	<i>P. stansburiana</i> , <i>Cowania mexicana</i>	cliff-rose	Shrub	Wide	Pres	Unc	Heaton s.n. (PISP)	1936	
Rosaceae	<i>Rosa woodsii</i>	<i>R. arizonica</i> , <i>R. woodsii</i> var. <i>ultramontana</i> . Includes <i>R. manca</i> .	Woods' rose	Shrub	Wide	Pres	Unc	Alexander 1239 (PISP)	1977	Cited by King (1977) as <i>R.</i> <i>arizonica</i>
Salicaceae	<i>Populus alba</i>		white poplar	Tree	Intro	Pres	Unc	Alexander 1253 (PISP)	1997	Native to Eurasia
Salicaceae	<i>Populus fremontii</i> var. <i>fremontii</i>	<i>P. fremontii</i> , <i>P.</i> <i>deltoides</i> var. <i>fremontii</i>	Fremont cottonwood	Tree	Wide	Pres	Unc	Alexander 1260 (PISP)	1998	
Salicaceae	<i>Populus nigra</i>		Lombardy poplar	Tree	Intro	Rep	?	Alexander (1998b)	1998	Native to Eurasia
Salicaceae	<i>Populus x canadensis</i>	Hybrid between <i>P.</i> <i>deltoides</i> x <i>P. nigra</i>	Carolina poplar	Tree	Intro	Pres	Unc	Fertig 23687 (PISP)	2007	
Salicaceae	<i>Populus x jackii</i>	Hybrid between <i>P. balsamifera</i> x <i>P.</i> <i>deltoides</i>	balm of Gilead	Tree	Intro	Pres	Unc	Nelson s.n. (RM)	1973	
Salicaceae	<i>Salix exigua</i> var. <i>stenophylla</i>	<i>S. exigua</i> var. <i>exigua</i>	coyote willow	Shrub	Wide	Pres	Unc	Alexander 1259 (PISP)	1998	
Saxifragaceae (Grossulariaceae)	<i>Ribes aureum</i>	<i>R. aureum</i> var. <i>aureum</i>	golden currant	Shrub	Wide	Pres	Unc	Fertig 23685 (PISP)	2007	
Saxifragaceae (Grossulariaceae)	<i>Ribes sativum</i>	<i>R. rubrum</i>	garden currant	Shrub	Intro	Rep	?	Alexander (1998b)	1998	Native to Europe

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Scrophulariaceae	<i>Castilleja chromosa</i>	<i>C. applegatei</i> <i>ssp. martinii</i> , <i>C. angustifolia</i> var. <i>dubia</i>	desert paintbrush	PerF	Wide	Pres	Unc	Evenden & Louie 29 (PISP)	2001	
Scrophulariaceae	<i>Castilleja linariifolia</i>	<i>C. linariaefolia</i>	Wyoming paintbrush	PerF	Wide	Pres	Unc	Alexander 1195 (PISP)	1998	
Scrophulariaceae	<i>Cordylanthus parviflorus</i>		smallflower bird's-beak	AnnF	Wide	Pres	Unc	Alexander 1229 (PISP)	1935	
Scrophulariaceae	<i>Penstemon laevis</i>		smooth penstemon	PerF	RegEn	Rep	?	Alexander (1998b)	1998	Type locality is Springdale, Washington Co., UT (Jones 5250 in part US)
Scrophulariaceae	<i>Penstemon palmeri</i> var. <i>eglandulosus</i>		Palmer's penstemon	PerF	RegEn	Pres	Unc	Fertig 23666 (PISP)	1998	Type locality is 2.5 miles N of Kanab, Kane Co., UT (Maguire, Maguire, & Piranian 12279 UTC)
Scrophulariaceae	<i>Penstemon utahensis</i>		Utah penstemon	PerF	Wide	Hist	?	Heaton 11 (PISP)	1937	
Simaroubaceae	<i>Ailanthus altissima</i>		tree-of-heaven	Tree	Intro	Pres	Unc	Fertig 23684 (PISP)	1935	Native to China
Solanaceae	<i>Chamaesaracha coronopus</i>		false nightshade	PerF	Wide	Pres	Rare	Fertig 23695 (PISP)	2007	
Solanaceae	<i>Datura wrightii</i>	<i>Datura meteloides</i>	angel's trumpet	AnnF	Wide	Pres	Unc	Heaton (1935)	1935	
Solanaceae	<i>Lycium pallidum</i>		pale wolfberry	Shrub	Wide	Pres	Unc	Fertig 23673 (PISP)	1977	
Solanaceae	<i>Nicotiana trigonophylla</i>	<i>N. obtusifolia</i> ; includes vars. <i>trigonophylla</i> & <i>palmeri</i>	desert tobacco	AnnF	Wide	Hist	?	Heaton s.n. (PISP)	1939	
Solanaceae	<i>Physalis crassifolia</i>		thick-leaved ground-cherry	PerF	Wide	Rep	?	Alexander (1998b)	1998	
Solanaceae	<i>Physalis hederifolia</i> var. <i>palmeri</i>	<i>P. hederifolia</i> var. <i>palmeri</i>	Palmer's ground-cherry	PerF	RegEn	Rep	?	Heaton (1935)	1935	

Appendix A. Confirmed, historical, and reported vascular plant taxa of Pipe Spring National Monument, organized by family and scientific name with taxonomic and biogeographic notes, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Pop. size	Source	Year doc.	Comments
Solanaceae	<i>Solanum sarrachoides</i>	<i>S. villosum</i> , <i>S. physalifolium</i> var. <i>nitidibaccatum</i>	ground-cherry nightshade	AnnF	Intro	Rep	?	Alexander (1998b)	NA	Native to South America
Tamaricaceae	<i>Tamarix chinensis</i>	<i>T. pentandra</i> , <i>T. ramosissima</i>	five-stamen tamarisk	Shrub	Intro	Rep	?	King (1977), Kurth (1998)	1977	Native to Eurasia
Ulmaceae	<i>Ulmus pumila</i>		Siberian elm	Tree	Intro	Pres	Unc	Nelson s.n. (RM)	1973	Native to Asia
Umbelliferae (Apiaceae)	<i>Berula erecta</i> var. <i>incisa</i>	<i>B. erecta</i>	cutleaf water- parsnip	PerF	Wide	Pres	Rare	Alexander 1245 (PISP)	1998	
Umbelliferae (Apiaceae)	<i>Cymopterus multinervatus</i>		purple-nerved spring-parsley	PerF	Wide	Pres	Unc	Louie & Evensen PISP-2 (PISP)	1937	
Verbenaceae	<i>Verbena bracteata</i>		prostrate vervain	PerF	Wide	Pres	Unc	Alexander 1216 (PISP)	1997	
Viscaceae	<i>Phoradendron juniperinum</i>		juniper mistletoe	PerF	Wide	Pres	Unc	Fertig 23677 (PISP)	1998	Typically parasitic on <i>Juniperus</i> <i>osteosperma</i>
Zygophyllaceae	<i>Larrea tridentata</i>		creosote bush	Shrub	Wide	Pres	Rare	Alexander 1237 (PISP)	2001	
Zygophyllaceae	<i>Tribulus terrestris</i>		puncturevine	AnnF	Intro	Pres	Unc	Alexander 1233 (PISP)	1997	AZ state prohibited and regulated noxious weed. Native to Eurasia.

Appendix B. Potential (unconfirmed) taxa of Pipe Spring National Monument.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Comments
Amaranthaceae	<i>Amaranthus albus</i>		tumble pigweed	AnnF	Intro	Native to tropical America
Amaranthaceae	<i>Amaranthus retroflexus</i>		redroot pigweed	AnnF	Intro	Native to Central America
Asclepiadaceae	<i>Asclepias speciosa</i>		showy milkweed	PerF	Wide	
Boraginaceae	<i>Cryptantha humilis</i>	<i>Oreocarya humilis</i>	dwarf cryptanth	PerF	Periph	
Boraginaceae	<i>Cryptantha recurvata</i>		recurved cryptanth	AnnF	Wide	
Boraginaceae	<i>Cynoglossum officinale</i>		common hound's-tongue	PerF	Intro	Native to Eurasia
Boraginaceae	<i>Lithospermum incisum</i>		showy stoneseed	PerF	Wide	
Cactaceae	<i>Pediocactus sileri</i>	<i>Utahia sileri</i>	Siler's pincushion cactus	PerF	LocEn	Type locality is Pipe Spring, Mohave Co., AZ (Siler s.n. MO). USFWS: Threatened
Capparaceae (Cleomaceae)	<i>Cleome serrulata</i>		Rocky Mountain beeplant	AbbF	Wide	
Chenopodiaceae	<i>Atriplex confertifolia</i>		shadscale	Shrub	Wide	
Chenopodiaceae	<i>Bassia scoparia</i>	<i>Kochia scoparia</i> ssp. <i>scoparia</i> , <i>B. sieversiana</i>	summer-cypress	AnnF	Intro	Native to Eurasia
Chenopodiaceae	<i>Chenopodium desiccatum</i>	Some authors include <i>C. pratericola</i>	desert goosefoot	AnnF	Periph	
Chenopodiaceae	<i>Chenopodium glaucum</i> var. <i>salinum</i>	<i>C. salinum</i>	oakleaf goosefoot	AnnF	Wide	
Chenopodiaceae	<i>Halogeton glomeratus</i>		halogeton	AnnF	Intro	Native to Eurasia
Chenopodiaceae	<i>Krascheninnikovia lanata</i> var. <i>lanata</i>	<i>Ceratoides lanata</i> , <i>Eurotia lanata</i> . Vars. not recognized in <i>Flora of North America</i> (2003).	winterfat	Shrub	Wide	
Chenopodiaceae	<i>Salsola paulsenii</i>		barbwire Russian thistle	AnnF	Intro	Native to Eurasia
Compositae (Asteraceae)	<i>Acamptopappus sphaerocephalus</i>	<i>A. sphaerocephalus</i> var. <i>sphaerocephalus</i>	goldenhead	Shrub	Wide	
Compositae (Asteraceae)	<i>Arctium minus</i>		burdock	PerF	Intro	Native to Eurasia
Compositae (Asteraceae)	<i>Artemisia spinescens</i>	<i>Picrothamnus desertorum</i>	budsage	Shrub	Periph	
Compositae (Asteraceae)	<i>Chaenactis douglasii</i>	Includes vars. <i>douglasii</i> & <i>montana</i>	hoary dusty-maiden	PerF	Wide	
Compositae (Asteraceae)	<i>Chaenactis fremontii</i>		Fremont's dusty-maiden	AnnF	Wide	
Compositae (Asteraceae)	<i>Chaenactis stevioides</i>		stevia dusty-maiden	AnnF	Wide	

Appendix B. Potential (unconfirmed) taxa of Pipe Spring National Monument, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Comments
Compositae (Asteraceae)	<i>Glyptopleura setulosa</i>		setose crustweed	AnnF	Wide	Type locality is near St. George, Washington Co., UT (Palmer 6 GH)
Compositae (Asteraceae)	<i>Helianthus petiolaris</i> ssp. <i>fallax</i>	Includes var. <i>petiolaris</i>	prairie sunflower	AnnF	Wide	
Compositae (Asteraceae)	<i>Taraxacum officinale</i>		common dandelion	PerF	Intro	Native to Eurasia
Cruciferae (Brassicaceae)	<i>Chorispora tenella</i>		blue mustard	AnnF	Intro	Native to Asia
Cruciferae (Brassicaceae)	<i>Lepidium virginicum</i> var. <i>pubescens</i>		poor-man's pepperwort	AnnF	Wide	
Cruciferae (Brassicaceae)	<i>Malcolmia africana</i>		African mustard	AnnF	Intro	Native to Africa
Cruciferae (Brassicaceae)	<i>Schoenocrambe linifolia</i>	<i>Sisymbrium linifolium</i>	flax-leaved plainsmustard	PerF	Wide	
Gramineae (Poaceae)	<i>Erioneuron pilosum</i>		hairy tridens	PerG	Wide	
Gramineae (Poaceae)	<i>Festuca octoflora</i>	<i>Vulpia octoflora</i> ; includes vars. <i>glauca</i> , <i>hirtella</i> , & <i>octoflora</i>	sixweeks fescue	AnnG	Wide	
Gramineae (Poaceae)	<i>Triticum aestivum</i>		wheat	AnnG	Intro	Native to Eurasia
Leguminosae (Fabaceae)	<i>Astragalus mollissimus</i> var. <i>thompsoniae</i>		woolly milkvetch	PerF	Wide	Type locality is Kanab, Kane Co., UT (Thompson s.n. GH)
Leguminosae (Fabaceae)	<i>Lupinus argenteus</i> var. <i>argenteus</i>		silvery lupine	PerF	Wide	
Nyctaginaceae	<i>Tripterocalyx micranthus</i>	<i>Abronia micrantha</i> , <i>T. pedunculatus</i>	small-flower sandpuffs	AnnF	Wide	
Onagraceae	<i>Oenothera coronopifolia</i>		hairy-throat evening-primrose	PerF	Wide	
Plantaginaceae	<i>Plantago patagonica</i>	<i>P. patagonica</i> var. <i>patagonica</i> , <i>P. purshii</i> ; includes vars. <i>gnaphaloides</i> , <i>spinulosa</i> , & <i>breviscapa</i>	woolly plantain	AnnF	Wide	
Polemoniaceae	<i>Linanthus dichotomus</i>		evening-snow	AnnF	Wide	
Polemoniaceae	<i>Phlox longifolia</i>	Includes vars. <i>longifolia</i> & <i>stansburyi</i>	long-leaf phlox	PerF	Wide	
Polygonaceae	<i>Eriogonum corymbosum</i> var. <i>thompsoniae</i>	<i>E. thompsoniae</i> var. <i>thompsoniae</i>	Thompson's wild buckwheat	Shrub	RegEn	Type locality is near Kanab, Kane Co., UT (Thompson s.n. GH). USFWS: 3C

Appendix B. Potential (unconfirmed) taxa of Pipe Spring National Monument, cont.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Comments
Polygonaceae	<i>Polygonum lapathifolium</i>	<i>Persicaria lapathifolia</i>	willow-weed	AnnF	Intro	Native to Eurasia
Ranunculaceae	<i>Ranunculus inamoenus</i>	<i>R. inamoenus</i> var. <i>inamoenus</i> . Includes var. <i>alpeophilus</i> .	drab buttercup	PerF	Wide	
Ranunculaceae	<i>Ranunculus testiculatus</i>	<i>Ceratocephala testiculata</i> , <i>C. orthoceras</i>	bur buttercup	AnnF	Intro	Native to Eurasia
Santalaceae	<i>Comandra umbellata</i> var. <i>pallida</i>	<i>C. pallida</i>	bastard toadflax	PerF	Wide	
Scrophulariaceae	<i>Castilleja scabrida</i> var. <i>scabrida</i>		Eastwood's paintbrush	PerF	RegEn	
Solanaceae	<i>Lycium andersonii</i>		Anderson's wolfberry	Shrub	Wide	

Appendix C. Rejected (falsely reported or questionable) taxa of Pipe Spring National Monument.

Family	Species name	Synonyms/ Taxonomic notes	Common name	Life form	Range	Park status	Comments
Agavaceae (Liliaceae)	<i>Yucca angustissima</i>	<i>Y. angustissima</i> var. <i>angustissima</i>	narrowleaved yucca	Shrub	RegEn	Ques?	Reported by King (1977), but probably based on <i>Y. kanabensis</i> .
Boraginaceae	<i>Cryptantha barbiger</i>		bearded cryptantha	AnnF	Wide	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>Plagiobothrys jonesii</i> . Type locality is St. George, Washington Co., UT (Parry 171 GH).
Cactaceae	<i>Opuntia basilaris</i>	<i>O. basilaris</i> var. <i>basilaris</i>	beavertail cactus	PerF	Wide	Ques?	Reported by King (1977), but probably based on <i>O. erinacea</i> var. <i>aurea</i> .
Chenopodiaceae	<i>Atriplex gardneri</i> var. <i>cuneata</i>	<i>A. cuneata</i>	valley saltbush	Shrub	RegEn	Ques?	Reported by Heaton (1935), but probably based on <i>A. canescens</i> .
Compositae (Asteraceae)	<i>Madia glomerata</i>		mountain tarweeed	AnnF	Periph	FalsRep	Report from Alexander (1998a) based on a misidentified specimen of <i>Cordylanthus parviflorus</i> .
Compositae (Asteraceae)	<i>Sonchus arvensis</i>		spiny-leaf sowthistle	AnnF	Intro	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>S. asper</i> . Native to Europe. AZ state prohibited noxious weed.
Fagaceae	<i>Quercus dumosa</i>		coastal sage scrub oak	Shrub	RegEn	Ques?	Reported by Heaton (1935), but probably based on <i>Q. turbinella</i> . <i>Q. dumosa</i> occurs in California but is not known from Arizona.
Hydrophyllaceae	<i>Phacelia ambigua</i>	<i>P. crenulata</i> var. <i>ambigua</i>	Jones' phacelia	AnnF	Wide	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>P. crenulata</i> var. <i>crenulata</i> .
Loasaceae	<i>Mentzelia nitens</i>	<i>M. nitens</i> var. <i>jonesii</i>	curvepod stickleaf	AnnF	Wide	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>M. albicaulis</i> .
Loasaceae	<i>Mentzelia pumila</i> var. <i>pumila</i>	<i>M. pumila</i>	Wyoming stickleaf	PerF	RegEn	FalsRep	Report from Alexander (1998a) based on a misidentified specimen of <i>M. multiflora</i> . Not known from Arizona
Malvaceae	<i>Sphaeralcea laxa</i>		caliche globe mallow	PerF	Wide	Ques?	Reported by King (1977), but probably based on <i>S. ambigua</i> .
Onagraceae	<i>Oenothera cespitosa</i> var. <i>marginata</i>		long-tube evening-primrose	PerF	Wide	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>O. cespitosa</i> var. <i>navajoensis</i> .
Polemoniaceae	<i>Gilia scopulorum</i>		rock gilia	AnnF	Wide	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>G. inconspicua</i> . Type locality is St. George, Washington Co., UT (Jones 1659 POM).
Scrophulariaceae	<i>Cordylanthus nevini</i>		Nevin's bird's-beak	AnnF	RegEn	Ques?	Reported by Heaton (1935), but probably based on <i>C. parviflorus</i> .
Umbelliferae (Apiaceae)	<i>Cymopterus purpureus</i>	<i>C. purpureus</i> var. <i>purpureus</i>	Colorado Plateau spring-parsley	PerF	RegEn	FalsRep	Report from PISP herbarium based on a misidentified specimen of <i>C. multinervatus</i> .

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
Trees									
Cupressaceae	<i>Juniperus scopulorum</i>	Rocky Mountain juniper	Native	Rep	NA	x	x		
Leguminosae (Fabaceae)	<i>Robinia pseudoacacia</i>	black locust	Intro	Pres	May–Jun				Cultivated
Pinaceae	<i>Pinus edulis</i>	two-needle pinyon	Native	Pres	NA		x		
Salicaceae	<i>Populus alba</i>	white poplar	Intro	Pres	Mar–Jun				Cultivated
Salicaceae	<i>Populus fremontii</i> var. <i>fremontii</i>	Fremont cottonwood	Native	Pres	Mar–Jun			x	
Salicaceae	<i>Populus nigra</i>	Lombardy poplar	Intro	Rep	Apr–May				Cultivated
Salicaceae	<i>Populus x canadensis</i>	Carolina poplar	Intro	Pres	Apr–May				Cultivated
Salicaceae	<i>Populus x jackii</i>	balm of Gilead	Intro	Pres	Apr–May				Cultivated
Simaroubaceae	<i>Ailanthus altissima</i>	tree-of-heaven	Intro	Pres	Jun–Jul				Disturbed areas
Ulmaceae	<i>Ulmus pumila</i>	Siberian elm	Intro	Pres	Mar–Apr			x	Disturbed areas
Shrubs									
Agavaceae (Liliaceae)	<i>Yucca baccata</i>	datil yucca	Native	Pres	Apr–Jun	x	x		
Agavaceae (Liliaceae)	<i>Yucca kanabensis</i>	Kanab yucca	Native	Pres	May–Jul	x	x		
Anacardiaceae	<i>Rhus aromatica</i> var. <i>simplicifolia</i>	squawbush	Native	Pres	May–Jul		x		
Anacardiaceae	<i>Rhus aromatica</i> var. <i>trilobata</i>	squawbush	Native	Rep	May–Jul			x	
Cactaceae	<i>Opuntia whipplei</i> var. <i>whipplei</i>	Whipple's cholla	Native	Pres	May–Jul	x			
Chenopodiaceae	<i>Atriplex canescens</i> var. <i>canescens</i>	fourwing saltbush	Native	Pres	May–Sep	x	x		
Chenopodiaceae	<i>Krascheninnikovia lanata</i> var. <i>subspinosa</i>	shrubby winterfat	Native	Hist	May–Jul	x			
Chenopodiaceae (Sarcobataceae)	<i>Sarcobatus vermiculatus</i>	greasewood	Native	Pres	May–Aug			x	
Compositae (Asteraceae)	<i>Artemisia bigelovii</i>	Bigelow's sagebrush	Native	Pres	Aug–Oct	x	x		
Compositae (Asteraceae)	<i>Artemisia filifolia</i>	sand sagebrush	Native	Pres	Aug–Oct	x			
Compositae (Asteraceae)	<i>Artemisia tridentata</i> var. <i>tridentata</i>	basin big sagebrush	Native	Pres	Jul–Oct	x			
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>consimilis</i>	greenish rabbitbrush	Native	Pres	Aug–Oct		x		

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Shrubs, cont.</i>									
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>gnaphalodes</i>	graystem rabbitbrush	Native	Pres	Aug-Oct	x			
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>graveolens</i>	glabrate rabbitbrush	Native	Rep	Aug-Oct	x	x	x	
Compositae (Asteraceae)	<i>Chrysothamnus nauseosus</i> var. <i>juncus</i>	rush rabbitbrush	Native	Pres	Aug-Oct		x		
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>puberulus</i>	puberulent rabbitbrush	Native	Pres	Jul-Sep	x			
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>stenophyllus</i>	slenderleaf rabbitbrush	Native	Pres	Jul-Sep	x	x		
Compositae (Asteraceae)	<i>Chrysothamnus viscidiflorus</i> var. <i>viscidiflorus</i>	green rabbitbrush	Native	Rep	Jul-Sep	x			
Compositae (Asteraceae)	<i>Gutierrezia microcephala</i>	thread snakeweed	Native	Pres	Jul-Oct	x	x		
Compositae (Asteraceae)	<i>Gutierrezia sarothrae</i>	broom snakeweed	Native	Pres	Jul-Oct	x	x		
Cupressaceae	<i>Juniperus osteosperma</i>	Utah juniper	Native	Pres	NA	x	x		
Elaeagnaceae	<i>Shepherdia rotundifolia</i>	roundleaf buffaloberry	Native	Pres	Mar-May	x	x		
Ephedraceae	<i>Ephedra torreyana</i>	Torrey's ephedra	Native	Pres	NA	x			
Ephedraceae	<i>Ephedra viridis</i> var. <i>viridis</i>	green ephedra	Native	Pres	NA	x	x		
Ephedraceae	<i>Ephedra viridis</i> var. <i>viscida</i>	Cutler's ephedra	Native	Pres	NA	x			
Fagaceae	<i>Quercus turbinella</i>	turbinella live-oak	Native	Pres			x		
Labiatae (Lamiaceae)	<i>Salvia dorrii</i> ssp. <i>dorrii</i>	Dorr's sage	Native	Pres	May-Jun		x		
Polygonaceae	<i>Eriogonum corymbosum</i> var. <i>aureum</i>	golden wild buckwheat	Native	Rep	Aug-Oct		x		
Polygonaceae	<i>Eriogonum corymbosum</i> var. <i>corymbosum</i>	crispleaf wild buckwheat	Native	Pres	Jul-Oct				
Rosaceae	<i>Amelanchier utahensis</i>	Utah serviceberry	Native	Pres	May-Jun		x		
Rosaceae	<i>Fallugia paradoxa</i>	Apache plume	Native	Pres	Apr-Aug		x		
Rosaceae	<i>Prunus americana</i>	American plum	Intro	Pres					Cultivated
Rosaceae	<i>Purshia mexicana</i> var. <i>stansburyana</i>	cliff-rose	Native	Pres	May-Jun	x	x		
Rosaceae	<i>Rosa woodsii</i>	Woods' rose	Native	Pres	May-Jul	x	x		
Salicaceae	<i>Salix exigua</i> var. <i>stenophylla</i>	coyote willow	Native	Pres	Apr-Aug			x	

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Shrubs, cont.</i>									
Saxifragaceae (Grossulariaceae)	<i>Ribes aureum</i>	golden currant	Native	Pres	Mar-Jul				Disturbed areas
Saxifragaceae (Grossulariaceae)	<i>Ribes sativum</i>	garden currant	Intro	Rep	May				Cultivated
Solanaceae	<i>Lycium pallidum</i>	pale wolfberry	Native	Pres	Mar-May	x	x		
Tamaricaceae	<i>Tamarix chinensis</i>	five-stamen tamarisk	Intro	Rep	Apr-Sep			x	
Zygophyllaceae	<i>Larrea tridentata</i>	creosote bush	Native	Pres	Apr-Jun	x			
<i>Perennial Forbs</i>									
Apocynaceae	<i>Amsonia jonesii</i>	Jones' amsonia	Native	Hist	Apr-Jun	x	x		
Apocynaceae	<i>Amsonia tomentosa</i> var. <i>stenophylla</i>	tomentose amsonia	Native	Hist	Apr-May	x			
Apocynaceae	<i>Apocynum cannabinum</i>	common dogbane	Native	Rep	Jun-Aug			x	
Asclepiadaceae	<i>Asclepias latifolia</i>	broadleaf milkweed	Native	Hist	Jun-Aug	x	x		
Asclepiadaceae	<i>Asclepias subverticillata</i>	whorled milkweed	Native	Pres	May-Sep	x			Disturbed areas
Boraginaceae	<i>Cryptantha confertiflora</i>	basin yellow cryptanth	Native	Pres	Apr-Jun	x	x		
Boraginaceae	<i>Cryptantha flava</i>	plateau yellow cryptanth	Native	Rep	Apr-Jun	x			
Boraginaceae	<i>Cryptantha fulvocanescens</i>	plateau cryptanth	Native	Hist	May-Jun	x			
Cactaceae	<i>Echinocereus engelmannii</i> var. <i>variegatus</i>	Glen Canyon hedgehog cactus	Native	Rep	Mar-Jul		x		
Cactaceae	<i>Echinocereus triglochidiatus</i> var. <i>melanacanthus</i>	claretcup	Native	Pres	Apr-Jun		x		
Cactaceae	<i>Echinocereus triglochidiatus</i> var. <i>mojavensis</i>	Mohave claretcup	Native	Hist	Apr-Jun	x	x		
Cactaceae	<i>Opuntia erinacea</i> var. <i>aurea</i>	Pipe Spring pricklypear	Native	Pres	May-Jun	x	x		
Cactaceae	<i>Opuntia erinacea</i> var. <i>utahensis</i>	Utah pricklypear	Native	Pres	May-Jun	x	x		
Cactaceae	<i>Opuntia fragilis</i>	brittle prickly-pear	Native	Rep	Jun-Jul	x	x		
Cactaceae	<i>Opuntia phaeacantha</i> var. <i>major</i>	large pricklypear	Native	Pres	Apr-Jul	x	x		
Cactaceae	<i>Opuntia pinkavae</i>	Pinkava's pricklypear	Native	Pres	May-Jun	x			
Cactaceae	<i>Sclerocactus whipplei</i> var. <i>roseus</i>	small-flower fishhook cactus	Native	Pres	Apr-May	x	x		

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Perennial Forbs, cont.</i>									
Compositae (Asteraceae)	<i>Artemisia campestris</i> var. <i>scouleriana</i>	sand wormwood	Native	Rep	Jul-Sep	x			
Compositae (Asteraceae)	<i>Artemisia dracunculus</i> sp. <i>glauca</i>	tarragon	Native	Rep	Jul-Oct	x			
Compositae (Asteraceae)	<i>Artemisia ludoviciana</i> var. <i>albula</i>	Louisiana wormwood	Native	Pres	Jul-Oct		x	x	
Compositae (Asteraceae)	<i>Aster hesperius</i>	Siskiyou aster	Native	Pres	Jul-Sep			x	
Compositae (Asteraceae)	<i>Chaetopappa ericoides</i>	rose-heath	Native	Pres	May-Sep	x	x		
Compositae (Asteraceae)	<i>Erigeron divergens</i> var. <i>divergens</i>	spreading daisy	Native	Pres	May-Sep	x			
Compositae (Asteraceae)	<i>Erigeron pumilus</i> var. <i>concinus</i>	Navajo fleabane	Native	Rep	May-Aug		x		
Compositae (Asteraceae)	<i>Gaillardia pinnatifida</i>	Hopi blanketflower	Native	Pres	Apr-Aug	x	x		
Compositae (Asteraceae)	<i>Grindelia squarrosa</i> var. <i>serrulata</i>	curlycup gumweed	Native	Rep	Jul-Sep				Disturbed areas
Compositae (Asteraceae)	<i>Hymenopappus filifolius</i> var. <i>cinereus</i>	common hyalineherb	Native	Pres	May-Oct	x			
Compositae (Asteraceae)	<i>Iva axillaris</i>	povertyweed	Native	Pres	May-Sep			x	
Compositae (Asteraceae)	<i>Machaeranthera canescens</i> var. <i>canescens</i>	hoary aster	Native	Pres	May-Sep	x	x	x	
Compositae (Asteraceae)	<i>Onopordum acanthium</i>	Scotch thistle	Intro	Rep	Jun-Sep			x	
Compositae (Asteraceae)	<i>Psilostrophe sparsiflora</i>	greenstem paperflower	Native	Hist	May-Sep				
Compositae (Asteraceae)	<i>Senecio douglasii</i> var. <i>longilobus</i>	Douglas' groundsel	Native	Pres	May-Oct	x			
Compositae (Asteraceae)	<i>Solidago</i> sp.	goldenrod	Native	Rep	Jun-Oct			x	
Compositae (Asteraceae)	<i>Stephanomeria pauciflora</i>	brown-plume wire lettuce	Native	Pres	May-Oct	x	x		
Compositae (Asteraceae)	<i>Thelesperma subnudum</i> var. <i>subnudum</i>	scapose greenthread	Native	Pres	May-Aug	x	x		
Compositae (Asteraceae)	<i>Townsendia incana</i>	hoary townsendia	Native	Pres	Apr-Jul	x	x		
Compositae (Asteraceae)	<i>Tragopogon dubius</i>	yellow salsify	Intro	Pres	May-Jul	x			
Convolvulaceae	<i>Convolvulus arvensis</i>	field bindweed	Intro	Hist	Jun-Aug				Disturbed areas
Cruciferae (Brassicaceae)	<i>Arabis perennans</i> var. <i>perennans</i>	perennial rockcross	Native	Rep	Mar-Jul		x		

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Perennial Forbs, cont.</i>									
Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>jonesii</i>	Jones' pepperwort	Native	Pres	Apr-Sep	x	x		
Cruciferae (Brassicaceae)	<i>Lepidium montanum</i> var. <i>stellae</i>	Stella's pepperwort	Native	Hist	May-Jun	x			
Cruciferae (Brassicaceae)	<i>Nasturtium officinale</i>	watercress	Intro	Pres	May-Sep			x	
Cruciferae (Brassicaceae)	<i>Stanleya pinnata</i>	prince's-plume	Native	Pres	Apr-Sep		x	x	
Cucurbitaceae	<i>Cucurbita foetidissima</i>	buffalo gourd	Native	Pres	May-Aug	x		x	Disturbed areas
Euphorbiaceae	<i>Chamaesyce albomarginata</i>	rattlesnake-weed	Native	Rep	Apr-Sep	x			
Euphorbiaceae	<i>Chamaesyce fendleri</i>	Fendler's spurge	Native	Pres	May-Sep	x	x		
Fumariaceae	<i>Corydalis aurea</i> var. <i>occidentalis</i>	golden corydalis	Native	Hist		x	x		
Gentianaceae	<i>Swertia albomarginata</i>	white-margined swertia	Native	Hist	May-Jul	x	x		
Gentianaceae	<i>Swertia utahensis</i>	Utah swertia	Native	Rep	Jun-Jul	x	x		
Iridaceae	<i>Sisyrinchium demissum</i>	blue-eyed grass	Native	Rep	Apr-Aug			x	
Labiatae (Lamiaceae)	<i>Marrubium vulgare</i>	common horehound	Intro	Pres	May-Oct	x	x		Disturbed areas
Labiatae (Lamiaceae)	<i>Mentha spicata</i>	spearmint	Intro	Pres	Jun-Aug			x	
Leguminosae (Fabaceae)	<i>Astragalus amphioxys</i> var. <i>vespertinus</i>	Sheldon's milkvetch	Native	Hist	Mar-Jun	x	x		
Leguminosae (Fabaceae)	<i>Astragalus ceramicus</i> var. <i>ceramicus</i>	painted milkvetch	Native	Pres	Apr-Jun	x			
Leguminosae (Fabaceae)	<i>Astragalus praelongus</i> var. <i>praelongus</i>	stinking milkvetch	Native	Rep	Apr-Jul		x	x	
Leguminosae (Fabaceae)	<i>Glycyrrhiza lepidota</i>	Nuttall's licorice	Native	Rep	May-Jul			x	
Leguminosae (Fabaceae)	<i>Medicago sativa</i>	alfalfa	Intro	Rep	May-Sep				Disturbed areas
Leguminosae (Fabaceae)	<i>Mellilotus officinalis</i>	yellow sweetclover	Intro	Rep	May-Oct			x	Disturbed areas
Leguminosae (Fabaceae)	<i>Pteris thompsoniae</i>	Thompson's peteria	Native	Pres	Apr-Jun		x		
Liliaceae (Themidaceae)	<i>Androstegium breviflorum</i>	pink funnel-lily	Native	Hist	Apr-May				
Liliaceae (Calochortaceae)	<i>Calochortus flexuosus</i>	sinuous mariposa	Native	Pres	Apr-Jun	x			
Loasaceae	<i>Mentzelia integra</i>	Virgin stickleaf	Native	Hist	Apr-Oct	x			
Loasaceae	<i>Mentzelia multiflora</i>	desert stickleaf	Native	Pres	Apr-Sep		x		
Malvaceae	<i>Althaea rosea</i>	hollyhock	Intro	Rep	Jun-Oct				Cultivated

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Perennial Forbs, cont.</i>									
Malvaceae	<i>Sphaeralcea ambigua</i> var. <i>ambigua</i>	Mohave globemallow	Native	Pres	Mar-Sep	x	x		
Malvaceae	<i>Sphaeralcea parvifolia</i>	small-leaf globemallow	Native	Hist	Mar-Oct	x	x		
Nyctaginaceae	<i>Abronia fragrans</i>	fragrant sand-verbena	Native	Pres	Apr-Sep				
Nyctaginaceae	<i>Mirabilis multiflora</i>	showy four-o'clock	Native	Pres	Apr-Jul		x		
Oleaceae	<i>Menodora scabra</i>	rough menodora	Native	Pres	Apr-Aug	x			
Onagraceae	<i>Epilobium ciliatum</i>	northern willow-herb	Native	Rep	Jun-Aug			x	
Onagraceae	<i>Gaura coccinea</i>	scarlet gaura	Native	Hist	May-Jul	x	x		
Onagraceae	<i>Oenothera caespitosa</i> var. <i>navajoensis</i>	Paria evening primrose	Native	Pres	Apr-Jun				x
Onagraceae	<i>Oenothera californica</i>	California evening primrose	Native	Pres	May-Jul	x			
Onagraceae	<i>Oenothera pallida</i> var. <i>pallida</i>	pale evening primrose	Native	Pres	May-Jul	x			
Orobanchaceae	<i>Orobancha ludoviciana</i>	Cooper's broomrape	Native	Pres	May-Jul		x		
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain	Intro	Rep	May-Aug				Disturbed areas
Plantaginaceae	<i>Plantago major</i>	common plantain	Intro	Pres	May-Aug			x	Disturbed areas
Polemoniaceae	<i>Ipomopsis longiflora</i>	long-flowered gilia	Native	Pres	May-Aug	x			
Polygalaceae	<i>Polygala subspinosa</i>	cushion milkwort	Native	Hist	May-Jun	x			
Polygonaceae	<i>Eriogonum inflatum</i> var. <i>inflatum</i>	desert trumpet	Native	Pres	Mar-Oct	x	x		
Polygonaceae	<i>Eriogonum microthecum</i> var. <i>simpsonii</i>	slender wild buckwheat	Native	Pres	Jun-Oct		x		
Polygonaceae	<i>Polygonum amphibium</i>	water smartweed	Native	Rep	Jun-Sep			x	
Polygonaceae	<i>Rumex crispus</i>	curly dock	Intro	Rep	May-Sep				x
Polygonaceae	<i>Rumex hymenosepalus</i>	canaigre dock	Native	Pres	Apr-Jun	x			
Ranunculaceae (Helleboraceae)	<i>Delphinium andersonii</i> var. <i>scaposum</i>	pale larkspur	Native	Hist	Apr-Jun	x	x		
Rosaceae	<i>Potentilla gracilis</i> var. <i>elmeri</i>	comb-leaf cinquefoil	Native	Hist	Jun-Aug				x
Scrophulariaceae	<i>Castilleja chromosa</i>	desert paintbrush	Native	Pres	Apr-Jun	x	x		
Scrophulariaceae	<i>Castilleja linariifolia</i>	Wyoming paintbrush	Native	Pres	Jul-Aug	x	x		
Scrophulariaceae	<i>Penstemon laevis</i>	smooth penstemon	Native	Rep	May-Jun		x		
Scrophulariaceae	<i>Penstemon palmeri</i> var. <i>eglandulosus</i>	Palmer's penstemon	Native	Pres	May-Aug	x	x		

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Perennial Forbs, cont.</i>									
Scrophulariaceae	<i>Penstemon utahensis</i>	Utah penstemon	Native	Hist	Apr–Jun		x		
Solanaceae	<i>Chamaesaracha coronopus</i>	false nightshade	Native	Pres	Apr–Jul	x			
Solanaceae	<i>Physalis crassifolia</i>	thick-leaved ground-cherry	Native	Rep	Mar–May		x		
Solanaceae	<i>Physalis hederifolia</i> var. <i>palmeri</i>	Palmer's ground-cherry	Native	Rep	May–Oct	x			
Umbelliferae (Apiaceae)	<i>Berula erecta</i> var. <i>incisa</i>	cutleaf water-parsnip	Native	Pres	Jun–Sep			x	
Umbelliferae (Apiaceae)	<i>Cymopterus multinerivatus</i>	purple-nerved spring-parsley	Native	Pres	Mar–Apr	x			
Verbenaceae	<i>Verbena bracteata</i>	prostrate vervain	Native	Pres	May–Sep			x	Disturbed areas
Viscaceae	<i>Phoradendron juniperinum</i>	juniper mistletoe	Native	Pres	Jul–Sep		x		
<i>Annual Forbs</i>									
Amaranthaceae	<i>Amaranthus blitoides</i>	prostrate pigweed	Native	Pres	Jun–Sep				Disturbed areas
Amaranthaceae	<i>Amaranthus hypochondriacus</i>	grain amaranth	Intro	Pres	Jun–Oct				Cultivated
Boraginaceae	<i>Cryptantha circumscissa</i>	cushion cryptanth	Native	Hist	Apr–Jul	x			
Boraginaceae	<i>Cryptantha crassisejala</i> var. <i>elachantha</i>	thick-sepaled cryptanth	Native	Hist	Apr–Jun	x	x		
Boraginaceae	<i>Cryptantha gracilis</i>	slender cryptanth	Native	Hist	Apr–Jul	x	x		
Boraginaceae	<i>Cryptantha micrantha</i>	redroot cryptanth	Native	Hist	Mar–May	x			
Boraginaceae	<i>Cryptantha pterocarya</i> var. <i>cycloptera</i>	wingnut cryptanth	Native	Hist	Apr–Jul	x			
Boraginaceae	<i>Cryptantha pterocarya</i> var. <i>pterocarya</i>	wingnut cryptanth	Native	Pres	Apr–Jul	x	x		
Boraginaceae	<i>Heliotropium convolvulaceum</i>	bindweed heliotrope	Native	Hist	May–Sep	x			
Boraginaceae	<i>Lappula occidentalis</i> var. <i>cupulata</i>	cupseed stickseed	Native	Pres	Apr–Jun				Disturbed areas
Boraginaceae	<i>Plagiobothrys jonesii</i>	Jones' popcorn-flower	Native	Pres	Apr–May	x			
Capparaceae (Cleomaceae)	<i>Cleome lutea</i>	yellow beeplant	Native	Pres	Apr–Sep	x			Disturbed areas
Chenopodiaceae	<i>Atriplex argentea</i> var. <i>argentea</i>	silver orach	Native	Pres	Jun–Sep				Disturbed areas
Chenopodiaceae	<i>Chenopodium album</i> var. <i>album</i>	lambquarter	Intro	Pres	Jun–Sep				Disturbed areas

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Annual Forbs, cont.</i>									
Chenopodiaceae	<i>Chenopodium fremontii</i> var. <i>fremontii</i>	Fremont's goosefoot	Native	Pres	Aug-Oct	x			
Chenopodiaceae	<i>Chenopodium leptophyllum</i>	narrowleaf goosefoot	Native	Rep	Jul-Sep	x			
Chenopodiaceae	<i>Salsola tragus</i>	Russian thistle	Intro	Pres	Jun-Sep	x	x		Disturbed areas
Chenopodiaceae	<i>Suaeda torreyana</i> var. <i>torreyana</i>	Torrey's seepweed	Native	Pres	Jun-Sep			x	
Compositae (Asteraceae)	<i>Ambrosia acanthicarpa</i>	bur ragweed	Native	Pres	Jul-Oct	x			
Compositae (Asteraceae)	<i>Ambrosia artemisiifolia</i>	common ragweed	Native	Pres	Jul-Oct	x			Disturbed areas
Compositae (Asteraceae)	<i>Chaenactis carphoclinia</i>	Gray's chaenactis	Native	Pres	Apr-Jun	x			
Compositae (Asteraceae)	<i>Conyza canadensis</i> var. <i>glabrata</i>	Canadian horseweed	Native	Rep	Jul-Sep			x	
Compositae (Asteraceae)	<i>Gaillardia arizonica</i>	Arizona blanketflower	Native	Rep	Apr-May	x			
Compositae (Asteraceae)	<i>Helianthus annuus</i> ssp. <i>lenticularis</i>	common sunflower	Native	Pres	Jun-Sep	x			
Compositae (Asteraceae)	<i>Lactuca serriola</i>	prickly lettuce	Intro	Pres	Jul-Sep			x	Disturbed areas
Compositae (Asteraceae)	<i>Layia glandulosa</i>	tidytips	Native	Pres	Apr-Jul	x	x		
Compositae (Asteraceae)	<i>Machaeranthera tanacetifolia</i>	tansyleaf aster	Native	Pres	May-Sep	x			Disturbed areas
Compositae (Asteraceae)	<i>Malacothrix glabrata</i>	filiform desert-dandelion	Native	Pres	Apr-Jul	x			
Compositae (Asteraceae)	<i>Malacothrix sonchoides</i>	sowthistle desert-dandelion	Native	Hist	Apr-Jun	x			
Compositae (Asteraceae)	<i>Sonchus asper</i>	spiny-leaf sow-thistle	Intro	Pres	Jul-Oct			x	
Compositae (Asteraceae)	<i>Sonchus oleraceus</i>	common sowthistle	Intro	Rep	Jul-Oct			x	
Compositae (Asteraceae)	<i>Stephanomeria exigua</i>	white-plume wire lettuce	Native	Pres	May-Sep				
Compositae (Asteraceae)	<i>Verbesina encelloides</i> var. <i>exauriculata</i>	golden crownbeard	Native	Pres	May-Oct	x			Disturbed areas
Compositae (Asteraceae)	<i>Xanthium strumarium</i> var. <i>canadense</i>	rough cocklebur	Native	Rep	Apr-Oct	x			Disturbed areas
Cruciferae (Brassicaceae)	<i>Capsella bursa-pastoris</i>	shepherd's-purse	Intro	Hist	Apr-Sep				Disturbed areas
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>glabra</i>	western tansymustard	Native	Hist	Mar-Aug	x	x		
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>intermedia</i>	western tansymustard	Native	Hist	Mar-Aug	x	x		

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Annual Forbs, cont.</i>									
Cruciferae (Brassicaceae)	<i>Descurainia pinnata</i> var. <i>osmiarium</i>	western tansymustard	Native	Pres	Mar-Aug	x	x		
Cruciferae (Brassicaceae)	<i>Descurainia sophia</i>	flixweed	Intro	Pres	Mar-Aug			x	Disturbed areas
Cruciferae (Brassicaceae)	<i>Dithyrea wislizeni</i>	spectaclepod	Native	Pres	Apr-Sep	x			
Cruciferae (Brassicaceae)	<i>Erysimum repandum</i>	spreading wallflower	Intro	Hist	Apr-Jun				
Cruciferae (Brassicaceae)	<i>Lepidium densiflorum</i> var. <i>ramosum</i>	prairie pepperwort	Native	Hist	May-Jul	x			
Cruciferae (Brassicaceae)	<i>Lepidium perfoliatum</i>	clasping pepperwort	Intro	Hist	May-Jul				Disturbed areas
Cruciferae (Brassicaceae)	<i>Sisymbrium altissimum</i>	tumble mustard	Intro	Pres	May-Aug	x		x	Disturbed areas
Cruciferae (Brassicaceae)	<i>Streptanthella longirostris</i>	long-beak fiddlemustard	Native	Hist	Mar-Jun	x	x		
Cyperaceae	<i>Cyperus</i> sp.	flat-sedge	Intro	Rep	Jun-Sep				Disturbed areas
Euphorbiaceae	<i>Chamaesyce glyptosperma</i>	ridge-seeded spurge	Native	Pres	Jun-Aug	x			Disturbed areas
Euphorbiaceae	<i>Chamaesyce prostrata</i>	prostrate spurge	Intro	Pres	May-Sep				Disturbed areas
Geraniaceae	<i>Erodium cicutarium</i>	stork's-bill	Intro	Pres	Feb-Oct	x		x	Disturbed areas
Hydrophyllaceae	<i>Phacelia crenulata</i> var. <i>corrugata</i>	corrugate phacelia	Native	Hist	May-Jun	x			
Hydrophyllaceae	<i>Phacelia crenulata</i> var. <i>crenulata</i>	crenulate phacelia	Native	Pres	May-Jun	x			
Hydrophyllaceae	<i>Phacelia ivesiana</i>	Ives' phacelia	Native	Pres	Apr-Jun	x	x		
Hydrophyllaceae	<i>Phacelia pulchella</i> var. <i>gooddingii</i>	Goodding's pretty phacelia	Native	Hist	Apr-May	x			
Leguminosae (Fabaceae)	<i>Lupinus pusillus</i> var. <i>pusillus</i>	dwarf lupine	Native	Hist	Apr-Jul	x			
Leguminosae (Fabaceae)	<i>Melilotus alba</i>	white sweetclover	Intro	Rep	May-Oct	x	x	x	Disturbed areas
Linaceae	<i>Linum aristatum</i>	broomflax	Native	Pres	Apr-Jun	x			
Loasaceae	<i>Mentzelia albicaulis</i>	white-stem blazingstar	Native	Pres	Apr-Aug	x			
Malvaceae	<i>Malva neglecta</i>	common mallow	Intro	Pres	Apr-Oct				Disturbed areas
Onagraceae	<i>Camissonia chamaenerioides</i>	slender-pod camissonia	Native	Pres	Apr-Jun	x			
Onagraceae	<i>Camissonia parryi</i>	Parry's camissonia	Native	Hist	May-Jun	x			
Onagraceae	<i>Camissonia parvula</i>	tiny camissonia	Native	Hist	May-Jun	x	x		
Onagraceae	<i>Gaura parviflora</i>	small-flowered gaura	Native	Pres	May-Aug				Disturbed areas
Onagraceae	<i>Oenothera albicaulis</i>	white-stem evening primrose	Native	Hist	Mar-Jun	x			

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Annual Forbs, cont.</i>									
Onagraceae	<i>Oenothera primiveris</i> var. <i>burfonus</i>	early evening primrose	Native	Rep	Mar–May	x			
Papaveraceae	<i>Eschscholzia minutiflora</i>	pygmy golden-poppy	Native	Pres	Fab–May	x			Sandy soil
Polemoniaceae	<i>Eriastrum eremicum</i>	Mohave eriastrum	Native	Hist	Apr–Jun				
Polemoniaceae	<i>Gilia inconspicua</i>	shy gilia	Native	Pres	Apr–Jul	x	x		
Polemoniaceae	<i>Gilia leptomeria</i> var. <i>leptomeria</i>	common gilia	Native	Hist	May–Jun	x	x		
Polemoniaceae	<i>Ipomopsis polycladon</i>	spreading gilia	Native	Hist	Apr–Jun	x			
Polemoniaceae	<i>Langloisia setosissima</i>	Mohave langloisia	Native	Hist	Mar–May	x			
Polygonaceae	<i>Centrostegia thurberi</i>	Thurber's spineflower	Native	Hist	Mar–Jul	x			
Polygonaceae	<i>Eriogonum cernuum</i> var. <i>cernuum</i>	nodding wild buckwheat	Native	Hist	Apr–Oct	x	x		
Polygonaceae	<i>Eriogonum deflexum</i>	skeletonweed wild buckwheat	Native	Hist	Apr–Oct	x			
Polygonaceae	<i>Eriogonum palmerianum</i>	Palmer's wild buckwheat	Native	Pres	Mar–Oct		x		
Polygonaceae	<i>Polygonum aviculare</i>	yard knotweed	Intro	Pres	May–Oct				Disturbed areas
Portulacaceae	<i>Portulaca oleracea</i>	common purslane	Intro	Pres	Jun–Sep	x			Disturbed areas
Scrophulariaceae	<i>Cordylanthus parviflorus</i>	smallflower bird's-beak	Native	Pres	Aug–Sep		x		
Solanaceae	<i>Datura wrightii</i>	angel's trumpet	Native	Pres	Apr–Oct			x	Disturbed areas
Solanaceae	<i>Nicotiana trigonophylla</i>	desert tobacco	Native	Hist	Mar–Oct	x			
Solanaceae	<i>Solanum sarrachoides</i>	ground-cherry nightshade	Intro	Rep	May–Oct				Disturbed areas
Zygophyllaceae	<i>Tribulus terrestris</i>	puncturevine	Intro	Pres	May–Sep				Disturbed areas
<i>Perennial Graminoids</i>									
Cyperaceae	<i>Carex nebrascensis</i>	Nebraska sedge	Native	Pres				x	
Cyperaceae	<i>Carex praeegracilis</i>	blackcreeper sedge	Native	Pres	May–Aug			x	
Cyperaceae	<i>Eleocharis parishii</i>	Parish's spikerush	Native	Pres	Apr–Sep			x	
Cyperaceae	<i>Scirpus pungens</i> var. <i>longispicatus</i>	three-square bulrush	Native	Pres	May–Aug			x	
Gramineae (Poaceae)	<i>Agropyron cristatum</i>	crested wheatgrass	Intro	Rep	Jun–Aug	x			Cultivated
Gramineae (Poaceae)	<i>Agrostis stolonifera</i>	redtop	Intro	Pres	Jun–Sep			x	
Gramineae (Poaceae)	<i>Aristida purpurea</i>	purple three-awn	Native	Pres	Mar–Sep	x	x		Disturbed areas
Gramineae (Poaceae)	<i>Bouteloua curtipendula</i>	sideoats grama	Native	Rep	Jul–Sep	x			

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
<i>Perennial Graminoids, cont.</i>									
Gramineae (Poaceae)	<i>Bouteloua eriopoda</i>	black grama	Native	Pres	Jun-Aug		x		
Gramineae (Poaceae)	<i>Bouteloua gracilis</i>	blue grama	Native	Pres	Jul-Sep	x	x		
Gramineae (Poaceae)	<i>Bromus inermis</i> var. <i>inermis</i>	smooth brome	Intro	Rep	Jun-Aug			x	
Gramineae (Poaceae)	<i>Distichlis spicata</i>	desert saltgrass	Native	Rep	Jun-Sep			x	
Gramineae (Poaceae)	<i>Elymus elongatus</i>	tall wheatgrass	Intro	Rep	Jun-Aug			x	
Gramineae (Poaceae)	<i>Elymus elymoides</i>	squirreltail	Native	Rep	May-Aug	x	x		
Gramineae (Poaceae)	<i>Elymus hispidus</i>	intermediate wheatgrass	Intro	Rep	Jun-Aug				Disturbed areas
Gramineae (Poaceae)	<i>Elymus smithii</i>	western wheatgrass	Native	Rep	Jun-Aug	x			
Gramineae (Poaceae)	<i>Elymus trachycaulus</i>	slender wheatgrass	Native	Hist	Jun-Aug			x	
Gramineae (Poaceae)	<i>Erioneuron pulchellum</i>	fluffgrass	Native	Rep	Apr-Aug	x	x		
Gramineae (Poaceae)	<i>Festuca arundinacea</i>	tall fescue	Intro	Rep	May-Jul			x	
Gramineae (Poaceae)	<i>Hilaria jamesii</i>	galleta	Native	Pres	May-Aug	x	x		
Gramineae (Poaceae)	<i>Hordeum jubatum</i>	foxtail barley	Native	Rep	Jun-Aug		x		
Gramineae (Poaceae)	<i>Muhlenbergia asperifolia</i>	scratchgrass	Native	Pres	Jul-Aug			x	
Gramineae (Poaceae)	<i>Muhlenbergia porteri</i>	bush muhly	Native	Pres	Jul-Oct	x			
Gramineae (Poaceae)	<i>Poa fendleriana</i>	muttongrass	Native	Rep	May-Aug	x	x		
Gramineae (Poaceae)	<i>Poa pratensis</i>	Kentucky bluegrass	Intro	Rep	May-Aug			x	
Gramineae (Poaceae)	<i>Polypogon semiverticillatus</i>	water polypogon	Intro	Rep	Jul-Aug			x	Disturbed areas
Gramineae (Poaceae)	<i>Sporobolus airoides</i> var. <i>airoides</i>	alkali sacaton	Native	Rep	Jun-Aug	x	x		
Gramineae (Poaceae)	<i>Sporobolus contractus</i>	spike dropseed	Native	Pres	Jun-Sep	x	x		
Gramineae (Poaceae)	<i>Sporobolus cryptandrus</i>	sand dropseed	Native	Pres	Jun-Aug	x			
Gramineae (Poaceae)	<i>Sporobolus flexuosus</i>	mesa dropseed	Native	Pres	Jun-Sep	x	x		
Gramineae (Poaceae)	<i>Stipa comata</i> var. <i>comata</i>	needle-and-thread	Native	Pres	May-Jul	x	x		
Gramineae (Poaceae)	<i>Stipa hymenoides</i>	Indian ricegrass	Native	Pres	May-Jul	x	x		
Gramineae (Poaceae)	<i>Stipa speciosa</i>	desert needlegrass	Native	Pres	Apr-Jun	x	x		
Juncaceae	<i>Juncus arcticus</i>	Baltic rush	Native	Pres	May-Jul			x	
Juncaceae	<i>Juncus ensifolius</i> var. <i>brunnescens</i>	Tracy's rush	Native	Hist	Jun-Aug			x	
Juncaceae	<i>Juncus torreyi</i>	Torrey's rush	Native	Pres	Jun-Aug			x	

Appendix D. Confirmed, historical, and reported taxa of Pipe Spring National Monument organized by life form and common name with ecological notes, cont.

Family	Species name	Common name	Nativity	Park status	Flower time	DesSh	Pin Jun	Wet	Comments
Annual Graminoids									
Gramineae (Poaceae)	<i>Bouteloua barbata</i>	sixweeks grama	Native	Pres	Aug-Oct	x			
Gramineae (Poaceae)	<i>Bromus diandrus</i>	rippgut brome	Intro	Pres	Apr-Jun	x		x	Disturbed areas
Gramineae (Poaceae)	<i>Bromus rubens</i>	red brome	Intro	Pres	Mar-Jun		x		
Gramineae (Poaceae)	<i>Bromus tectorum</i>	cheatgrass	Intro	Pres	May-Jul	x	x	x	Disturbed areas
Gramineae (Poaceae)	<i>Cenchrus longispinus</i>	field sandbur	Native	Rep	Jul-Sep	x			Disturbed areas
Gramineae (Poaceae)	<i>Echinochloa crus-galli</i>	barnyardgrass	Intro	Rep	Aug-Sep				Disturbed areas
Gramineae (Poaceae)	<i>Eragrostis cilianensis</i>	stinkgrass	Intro	Rep	Jul-Sep				Disturbed areas
Gramineae (Poaceae)	<i>Eragrostis mexicana</i>	Mexican lovegrass	Intro	Rep	Jul-Oct				Disturbed areas
Gramineae (Poaceae)	<i>Eragrostis pectinacea</i>	tufted lovegrass	Native	Pres	Jul-Aug				Disturbed areas
Gramineae (Poaceae)	<i>Hordeum murinum</i>	rabbit barley	Intro	Pres	May-Jul	x			Disturbed areas
Gramineae (Poaceae)	<i>Munroa squarrosa</i>	false buffalograss	Native	Pres	Jun-Sep	x			
Gramineae (Poaceae)	<i>Polypogon monspeliensis</i>	rabbitsfootgrass	Intro	Pres	Jun-Aug			x	Disturbed areas

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.

NPS D-222, October 2008

National Park Service
U.S. Department of the Interior



Natural Resource Program Center
1201 Oak Ridge Drive, Suite 150
Fort Collins, Colorado 80525

www.nature.nps.gov