

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Pediocactus peeblesianus* var. *fickeiseniae*

COMMON NAME: Fickeisen plains cactus

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: May 11, 2004

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for Fickeisen plains cactus. We continue to monitor Fickeisen plains cactus populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current Candidate Notice of Review (CNOR) provides information on listing actions taken during the last 12 months.

No Listing priority change

Former LP: \_\_\_\_\_

New LP: \_\_\_\_\_

Date when the species first became a Candidate (as currently defined): July 1, 1975

Candidate removal: Former LP: \_\_\_\_\_

A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

U – Taxon not subject to the degree of threats sufficient to warrant issuance of a

proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

- F – Range is no longer a U.S. territory.
- I – Insufficient information exists on biological vulnerability and threats to support listing.
- M – Taxon mistakenly included in past notice of review.
- N – Taxon does not meet the Act’s definition of “species.”
- X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Plant, Cactaceae

LAND OWNERSHIP: The Fickeisen plains cactus occurs on lands managed by the U.S. Bureau of Land Management (BLM), the Navajo Nation, the Arizona State Land Department, U.S. Forest Service (USFS), and possibly on private land. The majority of the habitat is managed by BLM. It occurs in Coconino and Mohave counties, Arizona.

LEAD REGION CONTACT: Sarah Quamme, 505-248-6419, [Sarah\\_Quamme@fws.gov](mailto:Sarah_Quamme@fws.gov)

LEAD FIELD OFFICE CONTACT: Mima Falk, Arizona Ecological Services Field Office, Tucson sub-office, 520-670-6150 ext 225, [Mima\\_Falk@fws.gov](mailto:Mima_Falk@fws.gov)

#### BIOLOGICAL INFORMATION:

Species Description: *Pediocactus peeblesianus* var. *fickeiseniae* (Fickeisen plains cactus) is a very small (2.5 to 6 centimeters (cm) (1.0 to 2.4 inches (in)) tall, 2 to 5.5 cm (0.8 to 2.2 in.) in diameter), unbranched cactus that shrinks into gravelly soils after flowering and fruiting, especially during dry periods (Arizona Rare Plant Committee 2001).

Taxonomy: All of the following information is from Heil (1981, pp. 28-31). The taxon was discovered by Mr. and Mrs. Denis Cowper in May of 1956. At that time, the plants were identified by W. Marshall Taylor, of the Desert Botanical Garden, as *Toumeyia peeblesiana*. Lyman Benson collected specimens near Cameron, Arizona in 1957 and 1959. Benson published the name *Pediocactus peeblesianus* var. *fickeisenii* in 1962 to describe these cacti. Benson changed the ending of the varietal name to var. *fickeiseniae* (indicating that the variety was named after a woman) in 1969. Other synonyms that have been used are *Navajoa fickeisenii* and *Toumeyia fickeisenii*. Heil (1981) recognized the name and taxon in a review of the genus *Pediocactus*.

Habitat: The taxon is endemic to soils derived from exposed layers of Kaibab limestone on canyon margins and well-drained hills in Navajoan desert or grasslands, at elevations between 4300 to 5450 feet (ft) (1310 to 1660 meters (m)) (Arizona Rare Plant Committee 2001).

#### Historical and Current Range and Status

Historical range: We have limited information regarding the historical range of this variety.

Heil (1981, p. 31) describes the variety as widespread along the ledges of the Little Colorado and Colorado rivers to the hills of the lower House Rock Valley. Benson (1982, p. 276) describes the range as Northern Arizona from hills in northeast Mohave County to the vicinity of the Colorado and Little Colorado rivers in the region of Grand Canyon and southeast Coconino County.

Current Range: *Pediocactus peeblesianus* var. *fickeiseniae* is known from Northern Arizona in Coconino, Mohave, and Navajo counties (Figure 1). Populations are widely scattered between the House Rock Valley and the Gray Mountain vicinity (Arizona Game and Fish Department 2004, p. 2). Phillips *et al.* (1982, p. 7) estimated that there were approximately eight populations scattered over a range of approximately 124 miles (mi) (200 kilometers (km)). This variety is known from approximately the same area as described by Heil (1981, p. 31) and Benson (1982, p. 276). The populations are widely scattered throughout their range, appearing where the substrate is suitable. The sites are isolated from one another by topography and unsuitable habitat. The populations were fairly small and the average densities measured at two sites were 3.5 plants/100 m<sup>2</sup> (Phillips *et al.* 1982, p. 7). In 2006, the Arizona Game and Fish Department (AGFD) noted 22 locations for the variety, including historical ones (Schwartz 2008 p. 1).

Status: The majority of suitable habitat on Bureau of Land Management (BLM) lands has been surveyed, and the number of plants on BLM lands is estimated to be less than 1,000 individuals and possibly less than 500 (Hughes 2005, p. 1). L. Hughes (BLM) stated that the plants are scattered and difficult to find. There are four BLM monitoring plots that are placed in sites of relatively dense concentrations of the variety and have been in place since 1986. Two of the plots, Dutchman and North Canyon, track specific cacti over time. Clayhole and Sunshine are transects where numbers of cacti are counted as detected, but the smaller cacti often are undetected, so the numbers are not as accurate as in the other plots. Since 1986, cacti in all plots have had various levels of mortality and numbers have fluctuated. Seed production seems low, and increases in recruitment and survival are related to wet years. Overall recruitment has been relatively low and there seems to be higher numbers of missing and/or dead cacti in drought years (2002 was a very dry year). The plots have had several years where recruitment was relatively high, but the numbers did not stay high and, in general, since 1986, the plots have stabilized with low numbers. These cacti retract into the ground during dry periods and may not reappear for several years. For this reason, it is often difficult to assess mortality in the monitoring plots. A summary of data from 2002 and 2004 to 2009 is presented in Table 1, and incorporates data from Hughes (2009, p. 6-9). For comparison, the number of cacti present in each plot in 1986 (when the monitoring plots were established), were: Dutchman (21), Clayhole (22), Sunshine (6), and North Canyon (14). During 1989 and the early 1990's, all plots contained relatively high numbers of cacti: Dutchman had 194 in 1991, Clayhole had 35 in 1992, Sunshine had 44 in 1992, and North Canyon had 36 in 1991 (Hughes 1995, pp. 48-50). Drought continued through 2008, but several of the plots (North Canyon and Sunshine Ridge) received more winter precipitation than the remaining plots. The Clayhole monitoring site was dry throughout 2008, and continues to support low numbers of cacti. The Dutchman plot continued to decline in overall numbers through 2008 due to drought conditions in the Mainstreet Valley, but seems to be slightly up in numbers in 2009. Drought conditions continued through 2009 (Hughes 2009, p. 1). Recruitment remains low for all of the monitoring plots, and the majority of individuals measured were in the large size class (16 to 30 mm. This population

structure indicates that recruitment and survivorship of seedlings is low (Hughes 2008, pp. 6-8).

**Table 1: BLM Monitoring Data for Fickeisens Plains Cactus**

Year	Total Numbers (By Site)			
	Dutchman	Clayhole	Sunshine	North Canyon
2002	30	60	12	24
2004	45	59	7	40
2005	34	59	33	40
2006	36	48	26	32
2007	32	38	30	39
2008	23	40	23	33
2009	33	37	33	31
Year	Recruitment (By Site)			
	Dutchman	Clayhole	Sunshine	North Canyon
2002	1	1	6	1
2004	2	4	1	7
2005	0	3	4	0
2006	1	2	0	0
2007	0	3	0	4
2008	0	4	8	2
2009	7	0	10	0
Year	Missing (By Site)			
	Dutchman	Clayhole	Sunshine	North Canyon
2002	39	16	0	15
2004	11	10	6	10
2005	14	25	0	11
2006	14	29	8	2
2007	16	34	11	0
2008	10	22	14	3
2009	8	20	4	4

Hughes estimates that 30 to 40 percent of occupied habitat on the BLM land is captured by the monitoring plots (Hughes 2005, p. 1).

In 1994, the Navajo Natural Heritage program surveyed for this variety on the Navajo Nation, and documented the presence of 280 cacti. Currently, there are 15 populations on the Navajo Nation, although most of the populations have very few numbers, usually less than 20, and a few locations have only one or two individuals. Re-surveying of known populations resulted in substantially fewer plants than originally reported. This prompted the Navajo Nation to set up a monitoring program for this variety. Plots were established in 2006 (Roth 2007, p. 1). Four circular plots were established in the vicinity of Salt Trail Canyon on the Navajo Nation. Each individual is tagged; size, reproductive status, and overall vigor are recorded annually in April.

Results from 2006 and 2007 show an increase in individuals (27 more cacti in 2007), but this was attributed to increased survey effort, not to recruitment in 2006. The plots started with a total of 120 individuals. The majority of plants (over 60 percent) were placed in the 20 to 29 mm size class; the rest were less than 20 mm. Reproductive effort was relative high in 2006, with 36 flower buds recorded; in 2007 only 3 flower buds were recorded. The majority of individuals were rated in excellent health in both years (Roth 2007, pp. 1-2).

The Kaibab National Forest has not monitored the variety and has no population estimates. They did find a new cluster of plants (a few individuals) in 2004 (Phillips 2005, p. 1). However, the USFS manages only a very small portion of the habitat.

## THREATS

### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

#### Trampling and Livestock Grazing

BLM monitoring found that individuals of the taxon have been trampled by livestock, and a large plant and six offshoots (stepped on by livestock in 2002) died during the last monitoring period in 2005. In 2004, six plants were killed by trampling in the Sunshine monitoring plot. There was no evidence of livestock trampling in the BLM plots in 2006 and 2007. In most cases, plants that are stepped on by livestock are killed. These cacti are very small and are easily smashed. The data indicate that trampling does occur periodically, but is not predictable. Areas that support these cacti, and that are open to livestock grazing, will continue to have periodic trampling of a few individuals in any given year. This could be a significant threat over time since the majority of the plants are on lands managed by BLM; all BLM locations are within grazing allotments. Trampling in occupied habitat may compact the soil and could lead to reductions in germination. We do not have the information to assess if this is happening because the BLM monitoring plots were not designed to evaluate this effect. As indicated by the BLM data, there has been very little recruitment in the monitored populations. All of this information is provided to the Service by the BLM. Yearly monitoring reports are sent to us and held in our files. At the time of its discovery in 2005, the Salt Trail monitoring site on the Navajo Nation had been severely impacted by livestock, especially sheep. No impacts were noted during the 2006 and 2007 monitoring trips (Roth 2007, p. 3).

Livestock grazing impacts this variety by potentially leading to an increase in rodent predation on the plants. Increased rodent predation on this variety is evident in drought years. The increase in predation is correlated with dry conditions and lack of herbaceous forage in the area. Livestock grazing contributes to the reduction of forage available for other herbivores (rabbits and rodents) and probably contributes to the increase in rodent predation on this variety, especially in drought years. See Factor C for more details.

#### Road Maintenance and Off-Highway Vehicle Use

Plants that are near roads (Navajo Trail) have been affected by vehicle use associated with road

maintenance activities. In other words, plants have been run over and damaged, and the habitat has been altered, most likely by compaction. The BLM is making an effort to coordinate these activities and minimize effects by marking plants and informing maintenance personnel (Hughes 2005, p. 1). Plants may also be affected by unauthorized vehicle use and unauthorized camping near roads. In October 2007, the Service plant ecologist visited a population of this variety on a remote site along the south rim of the Grand Canyon. Despite the site's remoteness, there were truck tracks indicating that someone had driven off the road directly to the canyon rim. The occupied habitat was not harmed, but was only a few feet away from the tracks. There was also a fire ring and evidence of camping in the area (Service 2007, p. 1). We cannot quantify the extent of these impacts on the taxon or its habitat, but they continue at some unknown level.

#### B. Overutilization for commercial, recreational, scientific, or educational purposes.

Illegal collection is a potential threat for all species of cacti, but it is a specific and definite threat for the genus *Pediocactus*. Phillips *et al.* (1982, p. 5) states, "Fickeisen plains cactus is highly sought after by cactophiles and is collected by commercial cactus collectors wherever it is found." *P. winkleri*, a federally listed species, is collected illegally from Capitol Reef National Park in southern Utah (National Park Service 2004, p. 1).

We spoke to a cactus grower in New Mexico who sells various species of *Pediocactus*, mainly through legally procured seed and a limited number of specimens grown from seed. He stated that the collection pressure for this species, *P. peeblesianus* and its varieties, has greatly decreased because growers in Europe produce quite a few plants. In addition, collectors have become much more sensitive about collecting live specimens and prefer photographing specimens in their native setting, rather than removing them (Brack 2005, p. 1).

For the period 1994 to 1997, the Convention on International Trade in Endangered Species (CITES) annual report documented a total of 5 specimens and 5015 seeds of *Pediocactus peeblesianus* var. *fickeiseniae* exported (CITES 1998, p. 6). We do not know what impact illegal collection has on this variety. In their 2003-2004 monitoring summary, the BLM reported that there had been vandalism on one of the monitoring plots, but it does not specify the type or extent of damage. One population of this variety was noted in a 1978 file note as being seriously reduced (Gierisch 1978, p. 1). We are not able to determine if vandalism was the cause of the reduction in numbers. Patrol of these areas is infrequent because they are in very remote locations.

We are not aware of any recent evidence of illegal collection. Service law enforcement staff was unable to find any information on legal or illegal shipments of this taxon in their database (Looney 2005, p. 1). If illegal collection has occurred we are unable to quantify the effects to the variety. Due to the remote locations of this variety, lack of patrol, and the desirability of this cactus variety, collection is still considered a threat, albeit a minor one.

#### C. Disease or predation.

Rodent predation on the taxon has been observed on the BLM monitoring plots and is a source of

mortality for this cactus. It is unknown whether the high numbers of cacti occasionally eaten by rodents and other herbivores is directly due to drought, or indirectly due to drought since livestock may graze other plants needed by herbivores, thus forcing herbivores to utilize this cactus (Hughes 1995, p. 48). The role of rodent predation in the natural history of this taxon is unknown. In 1992, Hughes noted that rodent predation resulted in the death of 26 cacti in the North Canyon plot. Rodent predation has been observed on *Pediocactus peeblesianus* var. *peeblesianus* and has contributed significantly to the decline of those monitored individuals (Phillips and Phillips 2004, p. 14). The increased rodent predation was correlated with dry conditions and lack of herbaceous forage in the area. We do not know the background levels of rodent predation, and the current monitoring plots do not address this question. We assume that in drought years, when herbaceous cover is reduced, cacti are eaten. If drought continues over a prolonged period, the effects on the overall population of this taxon may be significant, given its low seed production and low overall survival of recruits. We know of no diseases that are affecting this taxon.

#### D. The inadequacy of existing regulatory mechanisms.

This cactus is protected from collection by the Arizona Native Plant Law (AGFD 2004, p.2) and CITES; however, CITES does not regulate take or domestic trade. The Arizona law prohibits collection of members of the genus *Pediocactus*, in particular, and all members of the family Cactaceae (Phillips *et al.* 1982, p. 9). While these measures lessen the impact from regulated collection, they do not address the loss of habitat or the loss of plants from private property.

This taxon is considered a sensitive species by both the BLM and the USFS. The BLM considers the needs of this variety in its allotment management planning. In fact, the monitoring plots were established within grazing allotments, in part, to determine if current grazing operations are affecting this taxon. BLM policy (BLM Manual 6840) states, “The BLM will carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats and will ensure that actions authorized, funded, or carried out do not contribute to the need to list any species as threatened or endangered.”

USFS policy in regards to sensitive species management does not allow for activities that will reduce the population viability of sensitive species on USFS lands. The Kaibab National Forest Plan has specific standards and guidelines for the management of sensitive species; standards and guidelines 960 and 961 call for the identification, protection, and improvement of habitat for listed and sensitive species. The plants on the Kaibab National Forest are within a grazing allotment; however, livestock grazing has been modified within this allotment to protect this taxon. The allotment is only grazed during the winter, when the plants are retracted, to minimize the direct effects of trampling from livestock.

This taxon is listed as category 3 on the Navajo Nation’s list of threatened, endangered, and sensitive species. Projects that need the review of the Navajo Nation are required to address the effects of the project on the species. There is a fine or imprisonment for “taking” individuals of this taxon on the Navajo Nation.

E. Other natural or manmade factors affecting its continued existence.

The monitoring done by the BLM and recent observations of the populations on the Navajo Nation suggest that numbers of this variety are declining. One of the factors that may be contributing to this decline is the continuing drought. There was virtually no recruitment, no observed mortality, and a large number of individuals on all the plots were missing or pulled down into the soil (Hughes 2006, p. 3). The winter was very dry in 2006. Mortality of plants has been associated with drought conditions, which have been on-going for at least the last six years and are predicted to continue for some time in the future (Seager *et al.* 2007, p.1183; Doster and Ferguson 2008, p.1). Arizona has had below average rainfall during 2001 through 2008, and in some areas longer than that. The results from the BLM monitoring also suggest that seedling recruitment and survival has been low (Hughes 1995, p. 18). Adult plants, which would be responsible for the production of seeds, have been removed from the population through predation (Hughes 1995, p. 48). This observed decline in seedling recruitment and survival is difficult to attribute to a single cause; it is more likely associated with a combination of environmental factors that are acting together to produce an overall decline in the reproductive status of these populations. Observations from the BLM plots and for monitoring plots on *Pediocactus peeblesianus* var. *peeblesianus*, a closely related federally listed variety, shows high germination is related to the timing and quantity of rainfall. A moderate increase in numbers may occur 2 to 3 times every 10 years. It is not known if there is a sufficient seed bank present in the soil to sustain these populations over time.

**CONSERVATION MEASURES PLANNED OR IMPLEMENTED:** A conservation agreement continues to be under consideration in cooperation with the BLM. However, the proposed conservation strategy and agreement was last worked on in 1995 and needs additional development. At this point, the conservation agreement as proposed has not included landowners beyond the BLM. In the draft conservation agreement, the BLM had agreed to continue monitoring the taxon, complete inventory on BLM lands, analyze the soil in occupied habitats, and update the allotment management plans that contain the taxon. To date, the BLM has continued to monitor the variety, continues to inventory potential habitat, has completed the soil analysis, and has entered into allotment management planning (Hughes 2005, p. 1). The USFS has indicated that they are willing to be included in the conservation agreement, and recently we initiated discussions with the Navajo Nation regarding their cooperation. We would like to reactivate work on finishing this conservation agreement in the next 2 to 3 years, pending availability of resources and interest of the other parties.

**SUMMARY OF THREATS:** The largest number of plants of this taxon is on BLM lands, where fewer than 1,000, and possibly fewer than 500 individuals, are estimated to occur. The 1994 survey of Navajo Nation lands documented the presence of 280 individuals, but the botanist for the Navajo Nation believes the populations are in decline. The Kaibab National Forest has not monitored this variety and has no population estimate, although they found a cluster of a few individuals in 2004. Although the range of the variety is large, the number of populations within the range is small, with less than 1,000 individuals known. There is likely more habitat to survey, but given the observed declines in numbers on BLM and Navajo lands, and the lack of recruitment seen in the BLM monitoring plots, there is legitimate concern regarding the status of

this variety. The taxon has been affected by the on-going drought and rodent predation. Habitat and populations remain vulnerable to off-road vehicle use, and, to a lesser extent, possible effects from livestock grazing (trampling) and collection. Thus, we find that this variety is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

**RECOMMENDED CONSERVATION MEASURES:** A range-wide status survey and monitoring protocol should be developed, either as part of the conservation agreement, or separately. This would allow us to assess the status of populations across the range of the variety on the various land management jurisdictions. A team should be assembled periodically to review the status and determine if actions are needed to minimize the threats to this endemic taxon. The land management agencies need to increase patrol in the habitat of this variety in order to reduce the effects from illegal off-road vehicle activity. Livestock grazing operations should take into account drought conditions and reduce or eliminate forage use in habitat of this variety during severe drought cycles. We will also continue to work with the managing land jurisdictions to complete the conservation agreement.

**LISTING PRIORITY**

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		Species	2
		<b>Subspecies/population</b>	<b>3*</b>
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate To Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

*Magnitude:* Anthropogenic threats to *Pediocactus peeblesianus* var. *fickeiseniae* are associated with habitat destruction and modification, primarily as a result of livestock trampling and off-road vehicle activity. Both of these activities continue to occur in the habitat of this rare variety. Since all of the locations of this variety on BLM lands are within grazing allotments, and the monitoring data provide evidence that trampling of plants does occur, we conclude that the threats are on-going, but we do not know how many individuals are affected. We are aware that

some unauthorized off-road activity and road-maintenance activities have affected this variety and its habitat, but we are unable to quantify the extent that habitat or plants have been negatively affected by these activities. Plants of this variety seem to be in decline on the Navajo Nation; however, we do not know why. The status of plants on USFS lands is unknown, but they manage only a small portion of the habitat. Within the BLM monitoring plots, overall numbers are fluctuating and there seems to be a downward trend, suggesting that the overall numbers in the population are declining. Drought and herbivore predation seem to be contributing to this decline. Given that there are only a few known populations, that the range of this taxon is limited, and that the majority of the known populations on BLM lands and the Navajo Nation are experiencing declines, we conclude that the threats are of a high magnitude.

*Imminence:* Since all of the locations of this variety on BLM lands are within grazing allotments and the monitoring data provide evidence that trampling of plants does occur, we conclude that these threats are on-going. Rodent herbivory, which may in part be due to some aspects of the livestock grazing program, is affecting this variety. The on-going drought continues to influence recruitment. Plants and habitat have been and will likely to continue to be negatively affected by unauthorized off-road vehicle activity and road maintenance issues. Based on this, we conclude that the threats are imminent because they are currently occurring.

X  Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No. This cactus is protected from collection by the Arizona Native Plant Law. The Arizona law prohibits collection of members of the genus *Pediocactus* in particular and all members of the family Cactaceae. Collecting pressure for this variety has been reduced due to its availability in the commercial trade. On-going activities, such as livestock grazing and unauthorized off-road vehicle use, have removed individuals of this taxon from the population, but not to the extent that the overall population has shown a dramatic decline which could lead to immediate extirpation of the taxon. Drought continues to affect the population, but not to the extent that populations are in danger of immediate extirpation.

DESCRIPTION OF MONITORING: To summarize, the BLM has four monitoring plots on the Arizona Strip and the Navajo Nation has set up four plots at Salt Trail Canyon. These were described in the background section of this document.

#### COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: None

Indicate which State(s) did not provide any information or comments: Arizona Department of Agriculture (agency with jurisdiction over plants in the state) reviewed this form and had no comments. This variety is not in Arizona's Comprehensive Wildlife Plan because the Arizona Department of Game and Fish has no authority to manage plants.

# Fickeisen Plains Cactus Candidate

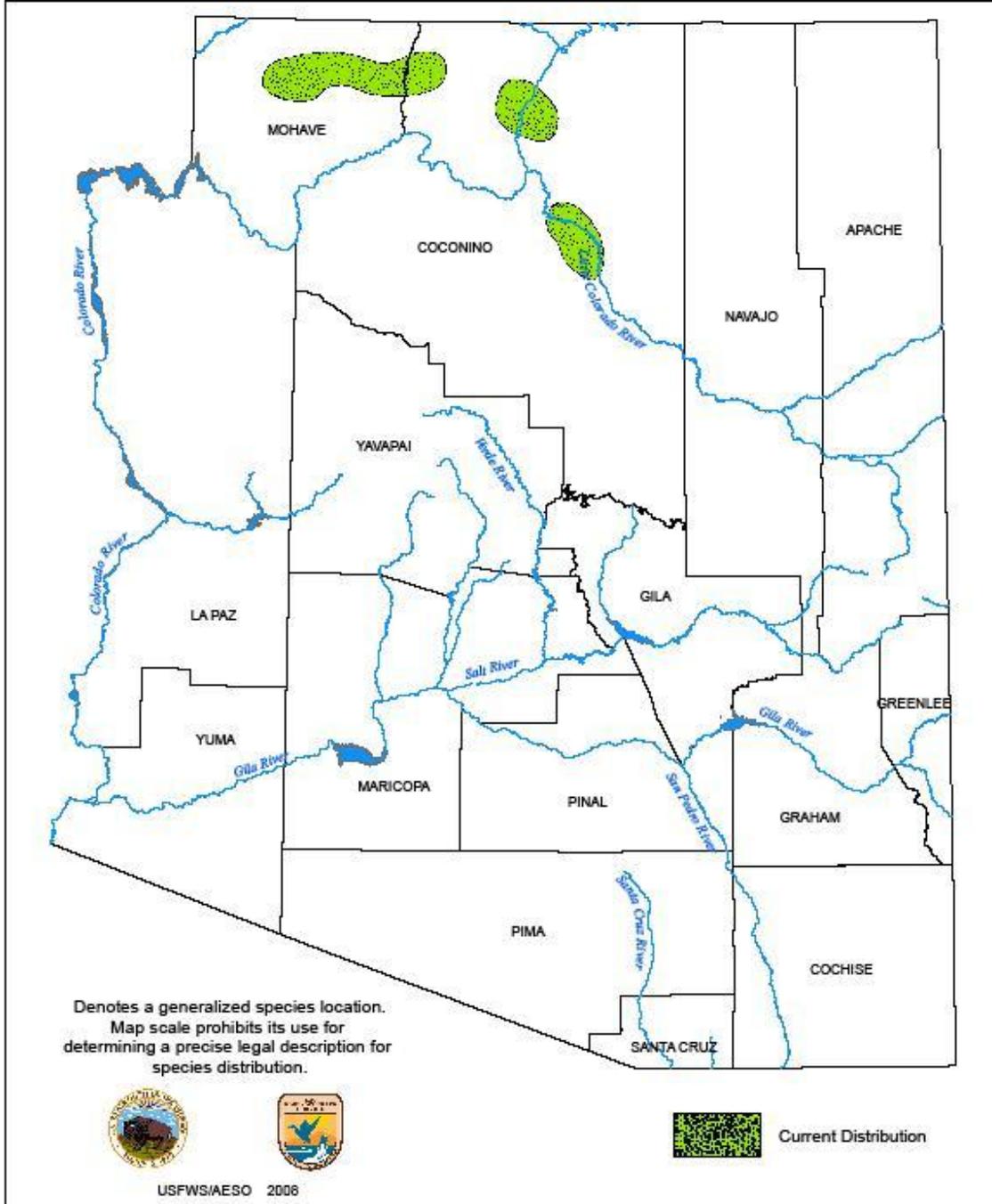


Figure 1. Distribution of Fickeisen's plains cactus.

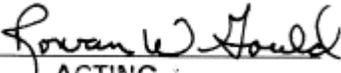
## LITERATURE CITED

- Arizona Game and Fish Department (AGFD). 2004. *Pediocactus peeblesianus* var. *fickeiseniae*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona. 6 pp.
- Arizona Rare Plant Committee. 2001. Arizona Rare Plant Field Guide.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford, California.
- Brach, S. 2005. Record of telephone conversation with Steve Brach, Mesa Garden, New Mexico, December 8, 2005.
- CITES Annual Report Data. 1998. U.S. trade in certain CITES plant taxa (for OSA) during 1994-1997.
- Doster, S., and D. Ferguson. 2008. A shift toward aridity: Westerly winds and other forces could make drought-prone regions even drier. Southwest Climate Outlook, March 2008. 3pp. <http://www.ispe.arizona.edu/climas/forecasts/swarticles.html>
- Heil, K., B. Armstrong, and D. Schlessler. 1981. A review of the genus *Pediocactus*. Cactus and Succulent Journal 53: 17-39.
- Hughes, L. 1995. Demographic monitoring of *Pediocactus peeblesianus* var. *fickeiseniae* on the Arizona Strip. In Southwestern Rare and Endangered Plants: Proceedings of the second conference. General Technical Report RM-GTR-283. 47-52.
- Hughes, L. Undated. Status report of *Pediocactus peeblesianus* var. *fickeiseniae* on the Arizona Strip District. Bureau of Land Management, St. George. 24 p.
- Hughes, L. 2004. An Update: Arizona Strip rare plant monitoring and inventory. Unpublished report. 21 pp.
- Hughes, L. 2005. Record of telephone conversation with Lee Hughes, December 6, 2005.
- Hughes, L. 2006. An Update: Arizona Strip Rare Plant monitoring and Inventory. Unpublished report. 17 pp.
- Hughes, L. 2008. Annual update 2008 of rare and listed plants on the Arizona Strip BLM. Unpublished report. 16 pp.
- Hughes, L.E. 2009. Annual Update 2009 of Rare and Listed Plants on the Arizona Strip BLM. Ecologist, Arizona Strip BLM. 21 p.

- Geirisch, R. 1978. Notes on visit to *Pediocactus peeblesianus* var. *fickeiseniae* population on Sunshine Ridge. U.S. Fish and Wildlife Service files. 4 pp.
- Looney, K. 2005. E-mail correspondence to M. Falk (U.S. Fish and Wildlife Service) regarding law enforcement cases of theft of *Pediocactus*. (Kate Looney was a law enforcement officer for U.S. Fish and Wildlife Service at the time).
- National Park Service. 2004. Natural resource year in review-2004. Chapter 3: Preserving threatened and endangered species. 4 pp.
- Navajo Natural Heritage Program. 1994. Survey for Fickeisen's plains cactus (*Pediocactus peeblesianus* var. *fickeiseniae*) on the Navajo Nation. 18 pp.
- Phillips, A.M. III, B.G. Phillips, L.T. Green III, J. Mazzone, and N. Brian. 1982. Status report: *Pediocactus peeblesianus* var. *fickeiseniae* L. Benson. Museum Of Northern Arizona, Flagstaff. 13 pp.
- Phillips, A.M., and B.G. Phillips. 2004. Population dynamics of Peebles Navajo cactus (*Pediocactus peeblesianus* var. *peeblesianus*): summary of a twenty-year monitoring program. Unpublished report submitted to U.S. Fish and Wildlife Service. 20 pp.
- Phillips, B.G. 2005. Record of telephone conversation with Dr. Barb Phillips, Coconino National Forest Botanist, December 5, 2005.
- Roth, D. 2007. Fickeisen Plains Cactus (*Pediocactus peeblesianus* ssp. *fickeiseniae*) monitoring report (Salt Trail Canyon monitoring site) 2006-2007. Unpublished report. 7 pp.
- Seager, R., M. Ting, I. Held, Y. Kushnir, J. Lu, G. Vecchi, H. Huang, N. Harnik, A. Leaman, N. Lau, C. Li, J. Velez, and N. Naik. 2007. Model projections of an imminent transition to a more arid climate in Southwestern North America. *Science* 316: 1181.
- Schwartz, S. 2008. E-mail correspondence from manager of Arizona Game and Fish Department's Heritage Data Management Department to M. Falk (U.S. Fish and Wildlife Service) regarding the number of known locations for *Pediocactus peeblesianus* var. *fickeiseniae* in Arizona. April 22, 2008.
- USFWS (Service). 2007. Notes from field trip to Trail canyon and south rim of Grand Canyon, October 17-18, 2007 in Service files, Tucson, Arizona.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:  May 21, 2010  
Acting Regional Director, Fish and Wildlife Service Date

Concur:   
ACTING :  
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010  
Conducted by: Mike Martinez