



MEMORANDUM

Date: January 7, 2002

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to be "CH", is written over the printed name "C.H. Huckelberry".

Re: **Wetlands Plant Evaluations for Agua Caliente Park**

The attached study publishes survey results for wetland plant communities of the Agua Caliente Park and nearby La Cebadilla property. Agua Caliente Park is a 42-hectare county park that features three man-made ponds fed by the Agua Caliente Spring. The 4 hectare La Cebadilla property is located five kilometers southeast of the Agua Caliente Park and supports wetland plants with subsurface water that is present due to a spring located on property just to the north of La Cebadilla. In addition to undertaking surveys to document wetland plant communities, the attached study was carried out to document the presence or absence of Huachuca water umbel, a plant listed as endangered in Pima County. The survey effort did not detect Huachuca water umbel at either the Agua Caliente Park or the La Cebadilla property. In the larger evaluation of wetland plants, however, an interesting finding came about. By studying the wetland plants of the La Cebadilla property, and through historic herbarium collections, the biologist found that several plants still present at La Cebadilla were known to be present at the Agua Caliente Ranch at the turn of the century. These findings, coupled with the loss of the Mexican garter snake at Agua Caliente Park, suggest that the site has been losing its native species diversity.

Pages 11 and 12 of the study provide examples of species found at the small property of La Cebadilla which are currently absent from Agua Caliente Park. The author suggests that "numerous manipulations of the hydrology, topography and vegetation" might account for the Agua Caliente species disappearances. "These and other species may still be represented in the seedbank at Agua Caliente Park and could reappear if adequate hydrological conditions are restored to these areas. Alternatively, the La Cebadilla property may be the last refugium for many cienega species in Pima County and may be an important seed source for reintroduction efforts at Agua Caliente Park and other county preserves." The study also suggests that repeated vegetation removals at Agua Caliente Park may favor the persistence of aggressive non-native species at the expense of native species.

These findings are significant for both current management and future restoration plans that Pima County will undertake for Agua Caliente Park and the La Cebadilla property. Staff from the Flood Control District and Natural Resources, Parks and Recreation Department are working to integrate these findings into management plans and projects consistent with the goals of the Sonoran Desert Conservation Plan.

Attachment

TABLE OF CONTENTS

1.0 INTRODUCTION	1
2.0 BACKGROUND INFORMATION	1
2.1 STUDY AREAS	1
2.1.1 Agua Caliente Park	1
2.1.2 La Cebadilla	3
2.2 HUACHUCA WATER UMBEL	3
3.0 METHODS	4
4.0 RESULTS	6
4.1 HUACHUCA WATER UMBEL	6
4.2 PLANT SPECIES SUMMARY	6
4.2.1 Agua Caliente Park	6
4.2.2 La Cebadilla	10
5.0 CONCLUSIONS AND RECOMMENDATIONS	11
REFERENCES	13
APPENDIX A - WETLAND PLANT SPECIES DETECTED IN THE STUDY AREA OCTOBER 2001	A-1
APPENDIX B - WILDLIFE SPECIES DETECTED IN THE STUDY AREA OCTOBER 2001	B-1
APPENDIX C - PHOTOGRAPHS OF THE STUDY AREA OCTOBER 2001	C-1
APPENDIX D - WETLAND PLANT SURVEY FORMS OCTOBER 2001	D-1

LIST OF FIGURES

Figure 1.	Location map for Agua Caliente Park and La Cebadilla Study areas.	2
Figure 2.	Agua Caliente Park, wetland plant survey segments, and adjacent PCFCD Property. .	5

1.0 INTRODUCTION

Pima County Flood Control District (PCFCD) contacted with SWCA, Environmental Consultants, Inc. to conduct surveys of aquatic and wetland plants at two County-owned properties. The purpose of these surveys was to identify and document dominant wetland plant communities and determine presence or absence of Huachuca water umbel (*Lilaeopsis schaffneriana* subspecies *recurva*), a federally-listed endangered plant that inhabits wetlands in southeastern Arizona. The subject properties are the Roy P. Drachman Agua Caliente Regional Park (Agua Caliente Park), where the results of this survey will aid in the development of an aquatic ecosystem restoration plan for the park, and the La Cebadilla property, which will provide biological information to support management decisions.

2.0 BACKGROUND INFORMATION

2.1 STUDY AREAS

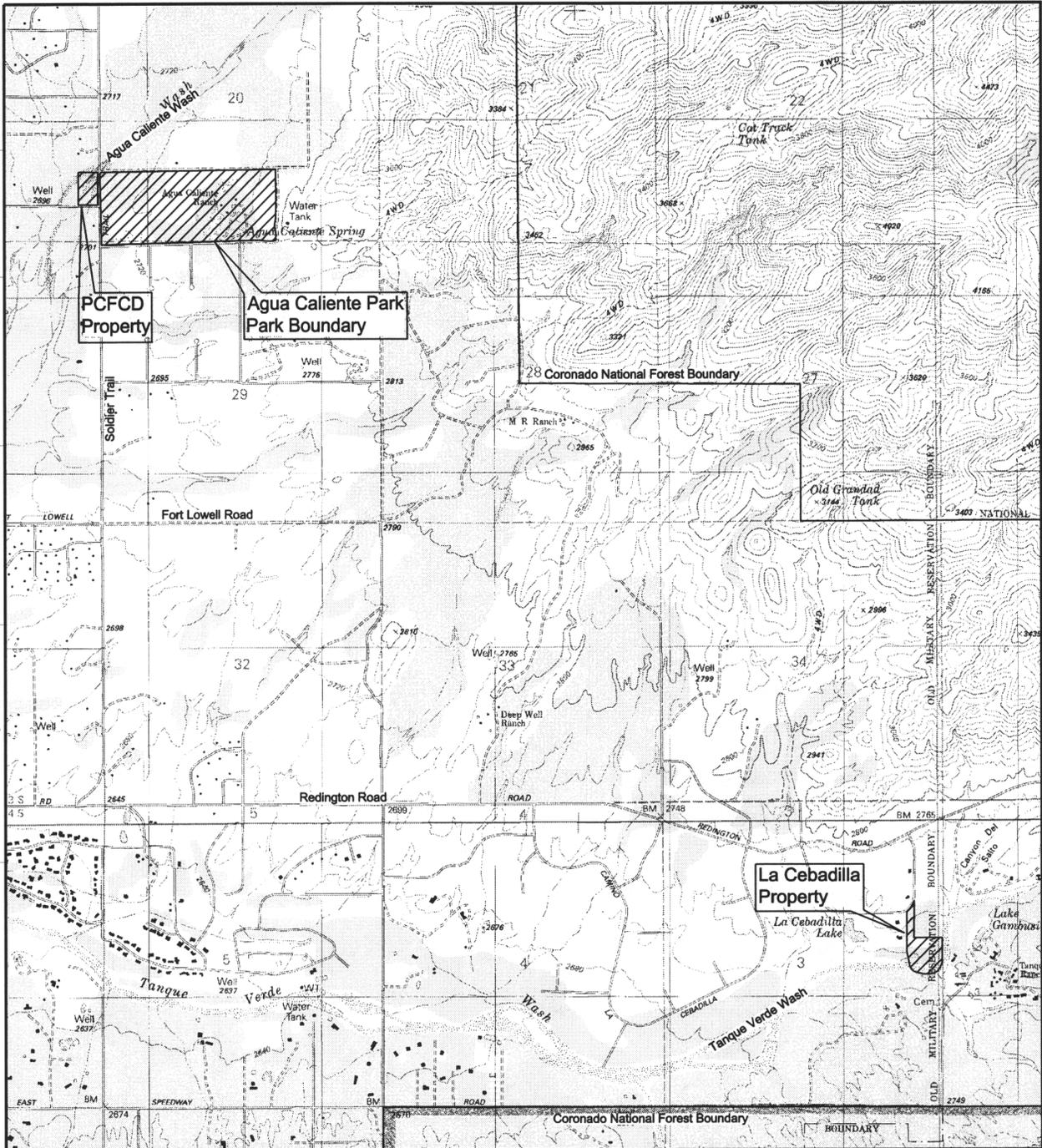
2.1.1 Agua Caliente Park

Agua Caliente Park is a 42-hectare reserve located on the eastern side of the Tucson Basin and within the foothills of the Santa Catalina Mountains. The Coronado National Forest boundary is approximately 1.6 kilometers east of the park (Figure 1). The northwestern portion of the park extends into the floodplain of Agua Caliente Wash, a major tributary of Rillito Creek. Although Agua Caliente Wash itself does not fall within the park, a portion of the wash located just northwest of the park crosses a parcel that is owned by PCFCD. Low density residential housing surrounds the park.

Previous use of the lands currently contained within the park includes an army encampment, a cattle ranch with orchards, and a hot springs resort. In 1984, Pima County was able to acquire the land with a monetary gift from Roy P. Drachman. It is difficult if not impossible to elucidate pre-Anglo conditions at Agua Caliente Spring and surrounding lands. The multitude of prior land uses within the park have altered the landscape, including hydrologic patterns and vegetative assemblages. A masterplan developed for the park in 1989 (WBLA) provided guidelines to preserve and enhance the existing resources to the greatest extent possible.

The Park currently encompasses a total of three man-made ponds that are fed by a warm spring (Agua Caliente Spring) via a series of constructed channels. Agua Caliente Spring flows year-round and water

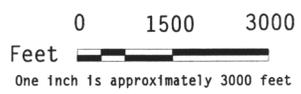
Date: 11-8-01
 Checked by:
 Drawn By: ekv
 Drawing: FFD_LDC.dwg
 CD: Tucson, E
 File: S:\arc03\4542\Task-31
 Proj. #: 4542-057



BASEMAP LOCATION



USGS 7.5 QUADRANGLE(S):
 AGUA CALIENTE HILL-1981
 TANQUE VERDE PEAK-1981
 T13&14S R16E
 Sections 20 and 3
 UTM 12-27



SWCA
 ENVIRONMENTAL CONSULTANTS

**AGUA CALIENTE
 PARK WETLAND
 PLANT SURVEYS**

Pima County, Ariz.

Figure 1. Location map for Agua Caliente Park and La Cebadilla study areas.

emerges from the ground at a temperature of approximately 30.4 degrees centigrade (87° F). Areas surrounding the spring, ponds, and channels include both landscaped areas and areas that are more typical of Sonoran Desertscrub habitats as described by Brown (1994). Waters within the Park are inhabited by numerous species of non-native fish including tilapia (genus and species uncertain), largemouth bass (*Micropterus salmoides*), and grass carp (*Ctenopharyngodon idella*). The Park is also intensively used by both resident and migratory ducks. Portions of the Park are closed to public entry in order to minimize disturbance to wildlife and to protect sensitive habitats.

The current management regime within the park includes removal of aquatic and emergent vegetation mats and sediment build-up by pond dredging, and removal of cattail stands and other emergent vegetation by hand-pulling, mowing, herbicide use, and controlled burns. The goals of vegetation removals are to maintain open water and improve visual quality within the ponds, and to maintain flow in the channels between each pond (Amy Loughner, PCPRD, pers. comm with P. Titus, 17 October 2001).

Additionally, the park is committed to an ongoing effort to remove saltcedar (*Tamarix ramosissima*), an invasive, non-native species, from the park. This species alters natural wetland hydrologic cycles by transpiring greater quantities of water than native vegetation, thereby artificially reducing water tables and some surface water habitats (USGS and WTI, 2001). Saltcedar also concentrates salt in its leaves and decomposing leaf litter, and raises soil and water salinity.

2.1.2 La Cebadilla

The La Cebadilla Property is an undeveloped parcel that was acquired by PCFCD in order to protect the adjacent Tanque Verde Creek from further channel disturbance. The property is located approximately 5 kilometers southeast of Agua Caliente Park (Figure 1) and encompasses approximately 4 hectares. A spring is located on another private property directly north of the subject property, and subsurface water from the spring supports a variety of wetland plants on both properties. Like Agua Caliente Park, the natural hydrology of the area has been altered as evidenced by constructed berms and ditches throughout both properties.

2.2 HUACHUCA WATER UMBEL

Huachuca water umbel is a rare, herbaceous, semi-aquatic to fully-aquatic perennial plant that is endemic to southeastern Arizona and northern Sonora, Mexico. The species was federally listed as endangered on January 6, 1997 (USFWS, 62 FR 3, 1997) because of threats posed by the degradation and loss of wetlands in the region that this species inhabits. Critical habitat was designated by USFWS on July 12, 1999 and included a total of 83.9 kilometers of streams or rivers in Cochise and Santa Cruz counties, Arizona (USFWS, 64 FR, 132). Huachuca water umbel is also designated a Highly Safeguarded Species under the Arizona Native Plant Law and is listed as a Sensitive Species by the U.S. Forest Service, Region 3.

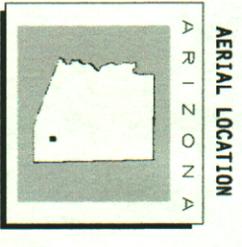
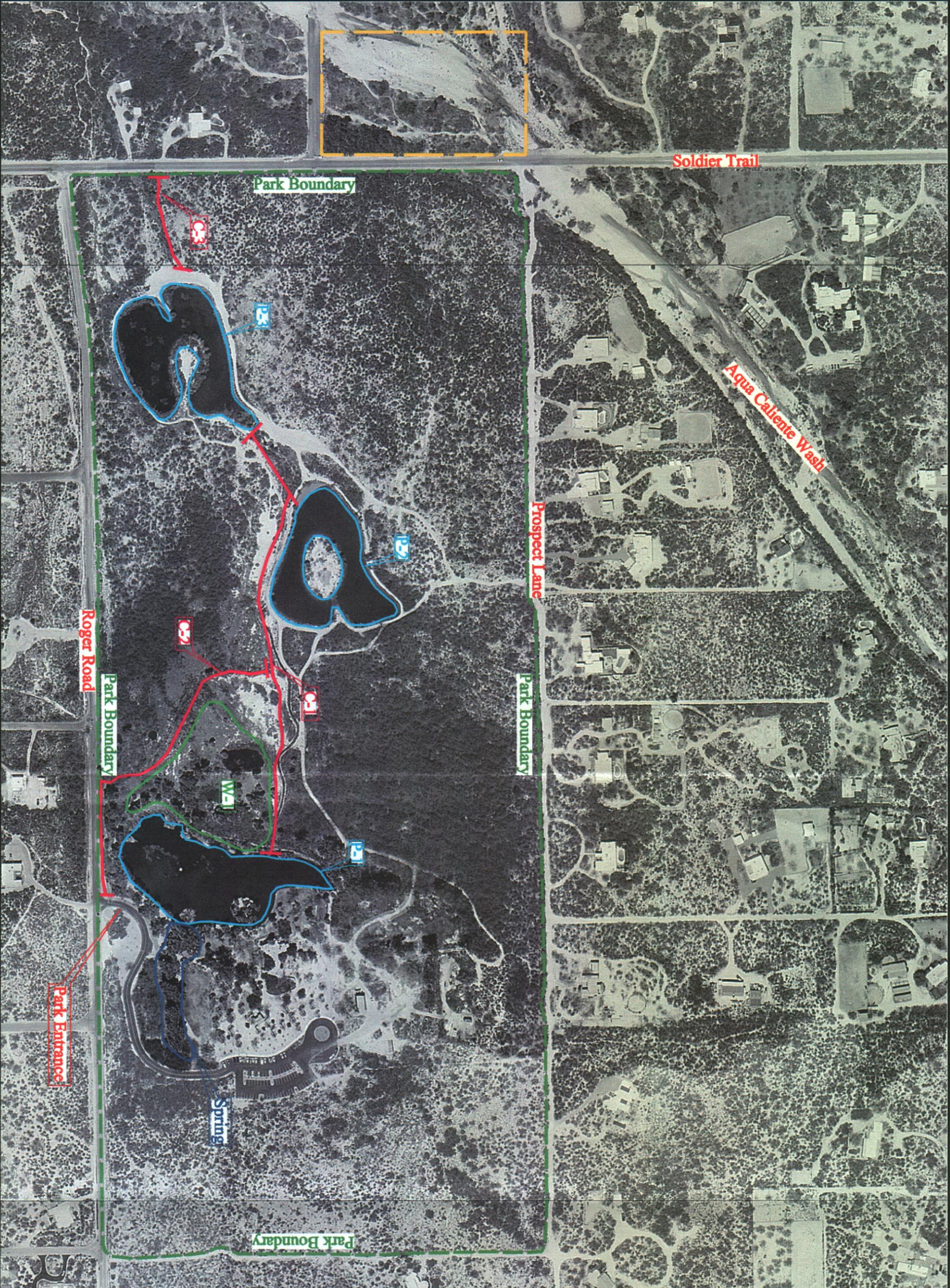
Historically, Huachuca water umbel was documented within the channel of the Santa Cruz River in Tucson. Changes in the river and associated floodplain, including the decline of the water table, has resulted in the loss of perennial flows and, consequently, the inability of the River to support this species. Until spring of 2001, the only known extant population of Huachuca water umbel in Pima County was at the Empire Cienega National Resource Area in southeastern Pima County (Recon 2001). In spring of 2001, PCFCD initiated a survey of several PCFCD properties that resulted in the detection of Huachuca Water umbel populations at two new sites: Cienega Creek Natural Preserve and Bingham Cienega Preserve (EEC 2001). The discovery of these new populations prompted a reassessment of the potential for this species to occur within other Pima County wetland habitats, and underscores the need for surveys in areas where wetland habitats may be disturbed.

Although there is much that is not understood regarding habitat requirements for Huachuca water umbel, the species is known to require perennial water, gentle stream gradients and mild winters, although it can recover from freezing (Recon 2001). It usually occurs in water depths ranging from 5 to 15 centimeters with sandy, muddy, or silty substrates (AGFD 1997), but typically requires some organic content in the substrate (Mima Falk, USFWS, pers. comm. with K. J. Kingsley, 1 May 2000).

3.0 METHODS

Nine survey areas were delineated at Agua Caliente Park; eight within the park and one just west of the park on adjacent PCFCD property (Figure 2). Prior to field evaluation, the Federal list of noxious weeds (USDA 2001) and the USGS list of non-indigenous aquatic plants for Arizona (2001) was reviewed in order to familiarize surveyors with non-native species of interest. Surveys were conducted by a team of two biologists who slowly walked transects throughout all wetland habitats within the Park's boundaries and one riparian habitat on adjacent PCFCD property. In most cases, transects extended along the wetted edge of these habitats, and these included the edges of ponds and associated islands, pond outlets, and flow channels. Additionally, the wetland habitat within the La Cebadilla property was examined and a plant list developed.

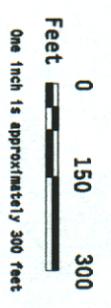
Wetland plant communities at Agua Caliente and La Cebadilla were carefully searched for the presence of Huachuca water umbel, and dominant aquatic and wetland plants were identified and catalogued during the survey. Each survey area was thoroughly searched at least twice. Surveys took place on 8, 9, 17, and 23 of October 2001. Survey areas, dominant wetland plants, and other subjects of interest were photographed during the surveys. Plant nomenclature in this report is based upon the U.S. Department of Agriculture



AERIAL LOCATION
 ARIZONA
 T13S, R16E
 Section 20
 Pima County, AZ
 Photo: Pima County, 1998



- KEY**
- PCFCD Property
 - Park Boundary
 - Pond
 - Wetland
 - Spring
 - Channel



**AGUA CALIENTE PARK
 WETLAND
 PLANT SURVEYS**

Pima County, Ariz.

Figure 2. Agua Caliente Park, wetland plant survey segments, and adjacent PCFCD Property.



National Resource Conservation Service Plants Database (<http://plants.usda.gov/>). Recent synonymy is included in the plant list in Appendix A.

4.0 RESULTS

4.1 HUACHUCA WATER UMBEL

Huachuca water umbel was not detected at Agua Caliente Park or the adjacent PCFCD property, or at the La Cebadilla property. In general, wetland habitats within Agua Caliente Park do not resemble those known to support the species elsewhere. In most cases, the microtopographic transition between the edge of the ponds and the surrounding land is abrupt and does not include the shallow refugia favored by this species. In other cases, the substrate is sandy and low in organic content. Two notable exceptions exist and both of these could potentially support Huachuca water umbel. The first is the channel that extends between the ponds (C1). This area has a silty, clay loam substrate and small, shallow off-channel habitats where flow is slow yet steady. The second is the point where this channel meets Pond Three. At this location, a shallow wetland expanse has formed with a silty clay loam substrate.

4.2 PLANT SPECIES SUMMARY

A description of each survey area and the dominant plants that characterize each area is provided below. A complete list of plants documented during the surveys is provided in Appendix A and a list of wildlife species is provided in Appendix B. A selection of representative photographs is provided in Appendix C. Survey data collection forms are provided in Appendix D.

4.2.1 Agua Caliente Park

4.2.1.1 Agua Caliente Spring. Agua Caliente Spring emerges from a pipe that directs flow from a former well to a pool, which feeds a broad channel leading to Pond One (Figure 2). Areas immediately surrounding the spring source lack aquatic and herbaceous vegetation, with the exception of scattered palm seedlings. Although park visitors are asked to view the spring from an elevated viewpoint, this policy is often disregarded and the lack of vegetation surrounding the spring is likely due to trampling by people and pets wading in the spring and outflow channel. The presence of picnic tables in close proximity to the spring run further encourages this tendency.

An overstory, composed of mature Washington fan palms (*Washingtonia robusta*) with scattered Fremont cottonwood (*Populus fremonti*) and Goodding's willow (*Salix gooddingii*), surrounds the spring and channel. Dominant understory species consist of velvet mesquite (*Prosopis velutina*), netleaf hackberry (*Celtis*

laevigata var. *reticulata*), lotebush (*Ziziphus obtusifolia*), and young fan palms. Patches of Bermudagrass (*Cynodon dactylon*) are present along lower portions of the outflow channel.

4.2.1.2 Pond One. Pond One is located at the terminus of the spring run channel (Figure 2). The pond contains a habitat island that currently is not accessible to the public due to the instability of a wooden bridge that once provided pedestrian access. A berm surrounds the northern and western edges of the pond.

The eastern edge of the pond is the most heavily visited portion of the park. This area is characterized by a large expanse of manicured lawn with scattered picnic tables and a mix of widely-scattered ornamental and native trees and shrubs. The lawn extends to the eastern edge of the pond and, along the shoreline, is interrupted by occasional patches of bare ground, a few southern cattail stands (*Typha domingensis*), and a patch of needle spikerush (*Eleocharis acicularis*). Park visitors often feed flocks of resident ducks in this area, and trampling and grazing by ducks is evident. In contrast, the western and southern portions of the pond that have either restricted access or are less easily accessible, are more densely vegetated.

Canopy species surrounding the pond and edges of the island consist of widely scattered Fremont cottonwood, Washington fan palm, velvet ash (*Fraxinus velutina*), and Goodding willow. Mature velvet mesquite trees are present along the edges of the berm along the northern, western, and southern edges of the pond. Sub-canopy and shrub species consist of smaller representatives of the canopy species in addition to lotebush, desertbroom (*Baccharis sarathroides*), and burroweed (*Isocoma tenuisecta*), all of which are present along the berm. Dominant emergent species consist of dense stands of cattail and chairmaker's bulrush (*Schoenoplectus americanus*). Cattail are also present in patches within shallow portions of the pond. Few aquatic species are present within the pond and all are present in small amounts. Small patches of spiny naiad (*Najas marina*) were found near the spring outlet and two species of algae, *Chara* sp. and *Tolypella* sp., were also present in small amounts, particularly near the edges of the pond.

The pond outlet is a screened culvert located near the berm on the north side of the pond. The culvert releases water into a constructed channel on the north side of the berm.

4.2.1.3 Pond Two. Pond Two is located northwest of Pond One (Figure 2). It also contains a habitat island that currently is not accessible to the public. A berm and footpath surround the edges of the pond and a viewing platform is present on the eastern side.

Canopy species surrounding both the pond and the edges of the island consist of widely scattered Washington fan palm, Fremont cottonwood, velvet mesquite and a single Goodding's willow. Subcanopy and shrub species consist of younger representatives of the canopy species and scattered saltcedar saplings. Additionally, desert broom, rough cocklebur (*Xanthium strumarium*), fourwing saltbush (*Atriplex canescens*) and burroweed vegetate higher portions of the bank. Dominant emergent species consist of southern cattail,

chairmaker's bulrush, strawcolored flatsedge (*Cyperus strigosus*), and Parish's spikerush (*Eleocharis parishii*). Small patches of spiny naiad, stonewort and *Tolypella* sp. are also present in the pond.

Pond Two receives water via a pipe from Channel One. The pipe extends under the pedestrian path that surrounds the pond and empties into the southeastern edge of the pond. The outlet of Pond Two is located just inside the western portion of the berm that surrounds the pond. A pipe conveys flow from the pond to a constructed channel just west of the berm.

4.2.1.4 Pond Three. Pond Three is located southwest of Pond Two (Figure 2). This pond contains a habitat island that is connected by a pedestrian footpath to the eastern side of the pond.

Canopy species surrounding both the pond and the edges of the island consist of a fragmented overstory of widely scattered Fremont cottonwood, Goodding's willow, and velvet mesquite. Dominant shrub species consist of scattered saltcedar saplings, rough cocklebur, fourwing saltbush, and burweed along higher portions of the berm that surrounds the pond. Cattail stands fringe portions of the wetted edge of the pond and form patches in shallow portions of the pond; many of these had been recently cut at the time of our survey. Small patches of Parish's spikerush, chairmaker's bulrush and strawcolored flatsedge are also present along the edges of the pond and habitat island, and one small stand of hardstem bulrush (*Schoenoplectus acutus*) is present along the northwestern pond edge. The only aquatic species documented in Pond Three is *Tolypella* sp. Many portions of the shoreline of this pond are lacking vegetation entirely.

Pond Three receives water via the constructed channel leading from Pond Two. At the point where water from the channel enters the pond, an expanse of emergent wetland plants are supported by a shallow flat portion of the pond. The pond is drained by the use of a floating intake structure which discharges through a bubble-up pipe in a channel west of the pond. This flow is then directed offsite.

4.2.1.5 Channel One. Channel One begins at the outlet of Pond One and extends between Ponds One and Two, and between Ponds Two and Three. Of the three channel segments described herein, Channel One is the only channel that has a permanent source of flow.

Canopy and subcanopy species along the edges of the channel consist of scattered velvet mesquite and Washington fan palm. Shrub species include young velvet mesquite, Washington fan palm, and Fremont cottonwood, widely scattered saltcedar saplings, and annual goldeneye (*Viguiera annua*) and rough cocklebur. Dominant emergent vegetation within the channel consists of patches of alkali sacaton (*Sporobolus airoides*), southern cattail, Parish's spike-rush, chairmaker's bulrush, and strawcolored flatsedge. All four aquatic species found within the park are present within Channel One, namely stonewort, spiny naiad, *Tolypella* sp. and pondweed (*Potamogeton pectinatus*).

4.2.1.6 Channel Two. Channel Two is an abandoned channel that once conveyed water from Pond One to Pond Two (Figure 2). Currently the channel is dry, however, the presence of dead stands of southern cattail and chairmaker's bulrush indicates that the channel once supported hydrophytic vegetation.

Canopy and subcanopy species consist of scattered velvet mesquite, Washington fan palm, and Fremont cottonwood. Scattered saltcedar, fourwing saltbush, and burweed predominate in the shrub community. Dominant herbaceous vegetation currently consists of Bermudagrass, alkali sacaton, and stinkgrass (*Eragrostis cilianensis*), however, southern cattail and chairmaker's bulrush appear to have been dominant in previous years.

4.2.1.7 Channel Three. Channel Three consists of the outflow channel from Pond Three (Figure 2). Water input to this channel is dependant upon water levels within the pond and the channel experiences long dry spells during times of drought.

Canopy and subcanopy species consist of scattered velvet mesquite, Washington fan palm, and Fremont cottonwood. Scattered saltcedar saplings, desert broom, and burweed are dominant in the shrub community. Dominant herbaceous vegetation consists of alkali sacaton and chairmaker's bulrush.

4.1.1.8 Wetland One. Wetland One is a broad area that includes a series of shallow depressions located west of Pond One and south of Channel One (Figure 2). The area appears to be the site of one of the ponds that was once excavated within the subject lands. Flow from Agua Caliente spring is no longer conveyed directly into the wetland, however the area has remained moist due to the shallow groundwater and collection of water from surrounding lands during storm events. At present, this area is best described as an alkaline meadow.

Large Washington fan palms are scattered throughout the wetland. Most of these have dense palm leaf skirts that provide cover for numerous wildlife species including bats. Additional canopy and subcanopy plants include scattered Fremont cottonwood, velvet mesquite, and velvet ash. Dominant shrub species include scattered young velvet mesquite, fourwing saltbush, and rough cocklebur. Scattered desert broom and saltcedar saplings are also present throughout the wetland. Dominant herbaceous species vary depending upon microtopographical characteristics. An expanse of inland saltgrass (*Distichlis spicata*) extends throughout the majority of the wetland, however, this species is replaced by Bermudagrass in slightly higher and drier soils. Other dominant species include southern cattail, chairmaker's bulrush, yerba mansa (*Anemopsis californica*), alkali sacaton, white prairie aster (*Symphyotrichum falcatum* var. *commutatum*), and Parish's spikerush.

There are shallow depressions within Wetland One that are largely devoid of vegetation. Although surface water was not present in these areas during our surveys, there was a cracked clay substrate with a salt crust that indicates that surface water is present during wetter seasons. Ephemeral species lacking during our surveys may appear when conditions are wetter.

4.2.1.9 Agua Caliente Wash. Agua Caliente Wash is a tributary to Rillito Creek. Although Agua Caliente Wash does not convey perennial surface flow in the subject portion of the wash, subsurface hydrology provides sufficient moisture to support hydrophytic vegetation. Many portions of the wash that pass through private properties outside the study area are subject to alteration as a result of groundwater pumping and channelization resulting from implementation of flood protection measures.

The portion of Agua Caliente Wash that passes through PCFCD property was once bordered by an extensive mesquite bosque. The canopy is now composed of velvet mesquite, sycamore (*Platanus wrightii*) and Fremont cottonwood which line the banks of the wash. Shrub species are widely scattered. Dominant shrub species include annual goldeneye, mule's fat (*Baccharis salicifolia*), desertwillow (*Chilopsis linearis*), and burrobush (*Hymenoclea salsola*). The center of the wash is a wide, sandy channel vegetated by desert strand species including sandysed clammyweed (*Polansia dodecandra* ssp. *trachysperma*), scarlet spiderling (*Boerhavia coccinea*), whitemargin sandmat (*Chaemaesyce albomarginata*), and scattered clumps of alkali sacaton.

4.2.2 La Cebadilla

The La Cebadilla wetland consists of an open wet meadow and a small ponded emergent wetland surrounded by mesquite bosque (Figure 2). Few trees are present in the portions of the wetland contained within PCFCD property. Scattered Fremont cottonwood are present but most are located around the spring source on private property north of subject parcel. Shrub species are also infrequent and are limited to desert broom, burweed, and a few saltcedar saplings on raised portions of the wetland, such as berms and hummocks. Herbaceous vegetation within the property includes many of the species present at Agua Caliente. Within the ponded portions of the property, cattail, chairmaker's bulrush, and Parish's spikerush are dominant. Meadow dominants include yerba mansa, alkali sacaton, stiff blue-eyed grass (*Sisyrinchium demissum*), alkalai marsh aster (*Almutaster pauciflorus*), beaked spikerush (*Eleocharis rostellata*), alkali muhly (*Muhlenbergia asperifolia*), inland saltgrass, and Arizona eryngo (*Eryngium sparganophyllum*). Another plant of interest documented during our survey at La Cebadilla is catchfly prairie gentian (*Eustoma exaltatum*), which is considered rare in Arizona. This plant was not evident during a spring survey of the wetland earlier this year.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Agua Caliente Park encompasses the remnants of a spring-fed cienega. Cienega ecosystems are controlled by permanently saturated hydrosols, within which reducing conditions preclude colonization by any but specialized organisms (Hendrickson and Minckley 1984). Immediate surroundings of cienegas are often rendered saline through capillary action and evapotranspiration. Thus halophytes, such as saltgrass and Alkali sacaton, often occur along these salt-rich marshland borders (ibid.).

Alkaline meadow species represented in Wetland One and at La Cebadilla are no longer as common as they once were in the region due to loss and alteration of climax cienega habitats. Although the presence of species characteristic of alkaline meadows at Agua Caliente Park is impressive, several notable species present at La Cebadilla are lacking at Agua Caliente Park. For example, Arizona eryngo (Figure C-7), which is a prominent member of the meadow community at La Cebadilla, is lacking at Agua Caliente Park. It is interesting that the species was documented at Agua Caliente Ranch in 1910 but was thought to have been extirpated from Arizona when Pantano Wash dried up and much of the area was developed (P. Jenkins, U of A Herbarium, pers. comm with P. Titus, 18 June 2001). Other cienega species that are present at La Cebadilla but are currently absent at Agua Caliente Park include stiff blue-eyed grass, Mexican rush, alkali marsh aster, and catch-fly gentian. Alkali marsh aster was collected at Agua Caliente Park in 1908 by botanists Thornber and Shreve but is no longer present. Perhaps the disappearance of Arizona eryngo, alkali marsh aster, and possibly other species from Agua Caliente Park, is the result of numerous manipulations of the hydrology, topography and vegetation within the lands the park encompasses. These and other species may still be represented in the seedbank at Agua Caliente Park and could reappear if adequate hydrological conditions are restored to these areas. Alternatively, the La Cebadilla property may be a last refugium for many cienega species in Pima County and may be an important seed source for reintroduction efforts at Agua Caliente Park and other county preserves.

In some of the Agua Caliente Park wetlands it is possible that repeated vegetation removals allow more aggressive species to persist while other species fail to thrive or have disappeared altogether. Additionally, the introduction of grass carp to the ponds during 2000, and the presence of numerous other exotic fish and the abundance of ducks has undoubtedly discouraged establishment and growth of aquatic and emergent species.

This survey took place at the end of a relatively dry summer. Huachuca water umbel is a perennial species that is typically monitored during the fall so that the full annual growth potential of the population can be assessed. Many annual species may not have been documented due to the dry summer and fall experienced in 2001. Thus, the full plant diversity of these sites may not be adequately represented by this survey.

Removal of saltcedar is on-going within Agua Caliente Park. Because saltcedar can produce many thousands of wind dispersed seeds, long-term removal and monitoring efforts for this species will be necessary to

prevent re-establishment. Other aggressive non-native species currently established within the park include Osage orange (*Maclura pomifera*), Australian saltbush (*Atriplex semibaccata*), Fivehorn smotherweed (*Bassia hyssopifolia*), and Bermudagrass (*Cynodon dactylon*).

Several microsites exist within the Park that appear marginally suitable for Huachuca water umbel. These consist of microsites along Channel One where it borders Wetland One and best resembles true cienega habitats where this species is known to occur, and the shallow emergent wetland at the point where Channel One meets Pond Three. If this species were to be introduced to Agua Caliente Park, the habitat management would need to incorporate measures to allow persistence of this species and minimize potential damage due to trampling by people, grazing by ducks, and vegetation maintenance activities.

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APPENDIX A

**WETLAND PLANT SPECIES DETECTED IN THE STUDY AREA
OCTOBER 2001**

This list includes dominant wetland plants and species of special interest observed on October 9th and 10th, 2001 within and adjacent to survey segments. It does not represent a comprehensive summary of all species that may occur within Agua Caliente Park.

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Ammannia pauciflorus</i> alkali marsh aster	<i>Aster pauciflorus</i> alkali marsh aster										X
<i>Anemopsis californica</i> yerba mansa					X	X		X			X
<i>Aristida purpurea</i> purple threeawn										X	
<i>Atriplex canescens</i> fourwing saltbush			X	X		X		X			
<i>Atriplex semibaccata</i> Australian saltbush					X						
<i>Amaranthus fimbriatus</i> fringed amaranth					X					X	
<i>Baccharis salicifolia</i> mule's fat	<i>Baccharis salicifolia</i> seep willow									X	
<i>Baccharis sarothroides</i> desert broom		X	X		X		X	X		X	X
<i>Bassia hyssopifolia</i> fivehorn smotherweed	<i>Bassia hyssopifolia</i> five-hook bassia				X						
<i>Boerhavia coccinea</i> scarlet spiderling					X					X	
<i>Bromus rubens</i> red brome										X	X

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species

* indicates identification is tentative due to the absence of reproductive structures

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Caesalpinia gilliesii</i> bird-of-paradise										X	
<i>Celtis laevigata</i> var. <i>reticulata</i> netleaf hackberry									X		
<i>Celtis pallida</i> spiny hackberry	<i>Celtis pallida</i> desert hackberry								X		
<i>Centaurium calycosum</i> Arizona centaury				X							
<i>Chara</i> sp.* stonewort		X	X	X							
<i>Chilopsis linearis</i> desert willow										X	
<i>Chamaesyce albomarginata</i> whitemargin sandmat										X	
<i>Chloris virgata</i> feather fingergrass					X					X	
<i>Cirsium</i> sp. thistle					X						
<i>Clematis ligusticifolia</i> western white clematis					X						
<i>Cucurbita digitata</i> fingerleaf gourd										X	
<i>Cynodon dactylon</i> Bermudagrass		X	X	X	X	X	X	X	X	X	X
<i>Cyperus strigosus</i> strawcolored flatsedge		X	X	X	X			X			

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species

* indicates identification is tentative due to the absence of reproductive structures

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Datura wrightii</i> sacred thornapple	<i>Datura meteloides</i> sacred datura									X	
<i>Distichlis spicata</i> inland saltgrass	<i>Distichlis spicata</i> desert saltgrass	X			X			X			X
<i>Echinochloa colona</i> jungle rice					X						
<i>Eleocharis acicularis</i> * needle spikerush		X									
<i>Eleocharis parishii</i> * Parish's spikerush		X	X	X	X			X			
<i>Eleocharis rostellata</i> beaked spikerush			X								X
<i>Ephedra trifurca</i> longleaf jointfir										X	
<i>Eragrostis cilianensis</i> stinkgrass					X	X					
<i>Eragrostis lehmanniana</i> Lehmann lovegrass					X					X	
<i>Eriogonum wrightii</i> bastardsage										X	
<i>Eryngium sparganophyllum</i> Arizona eryngo											X
<i>Eustoma exaltatum</i> catch-fly gentian											X
<i>Evolvulus arizonicus</i> wild dwarf morning-glory										X	

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species
* indicates identification is tentative due to the absence of reproductive structures

Scientific Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
Common Name											
<i>Fraxinus velutina</i> velvet ash		X			X			X			
<i>Gnaphalium chilensis</i> cotton batting					X					X	
<i>Gossypium thurberi</i> Thurber's cotton										X	
<i>Guara parviflora</i> lizardtail					X	X		X			
<i>Helianthus annuus</i> common sunflower		X			X			X			
<i>Hymenoclea salsola</i> burrobush										X	
<i>Isocoma tenuisecta</i> burroweed		X			X	X	X	X	X		X
<i>Juncus mexicanus</i> Mexican rush											X
<i>Juncus torreyi</i> Torrey's rush					X						
<i>Lepidium</i> sp. pepperwort					X				X		
<i>Leptochloa panicea</i> ssp. <i>brachiata</i> mucronate sprangletop	<i>Leptochloa filiformis</i> sprangletop				X						
<i>Muhlenbergia asperifolia</i> alkali muhly											X

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species
* indicates identification is tentative due to the absence of reproductive structures

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Najas marina</i> spiny naiad		X	X		X						
<i>Nicotiniana glauca</i> tree tobacco					X						
<i>Opuntia</i> spp. prickly pear species								X			X
<i>Panicum obtusum</i> vine mesquite					X		X				
<i>Pappophorum vaginatum</i> pappusgrass			X		X		X				
<i>Parkinsonia aculeata</i> Jerusalem thorn	<i>Parkinsonia aculeata</i> Mexican paloverde									X	
<i>Paspalum dilatatum</i> dallisgrass					X						
<i>Platanus wrightii</i> Arizona sycamore											
<i>Polansia dodecandra</i> sp. <i>trachysperma</i> sandyseed clammyweed										X	
<i>Polygogon monospelensis</i> annual rabbitfoot grass					X		X				X
<i>Potamogeton pectinatus</i> * pondweed					X						
<i>Populus fremontii</i> Fremont cottonwood		X	X	X	X	X	X	X	X	X	X

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species

* indicates identification is tentative due to the absence of reproductive structures

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Prosopis velutina</i> velvet mesquite		X	X	X	X	X	X	X	X	X	X
<i>Salix gooddingii</i> Goodding's willow		X	X	X					X		
<i>Salsola tragus</i> prickly Russian thistle				X	X						
<i>Schoenoplectus acutus</i> hardstem bulrush	<i>Scirpus acutus</i> hardstem bulrush			X							
<i>Schoenoplectus americanus</i> chairmaker's bulrush	<i>Scirpus americanus</i> American bulrush	X	X	X	X	X	X	X			X
<i>Sisyrinchium demissum</i> stiff blue-eyed grass											X
<i>Solidago</i> sp. goldenrod										X	
<i>Sphaeralcea ambigua</i> desert globemallow					X						
<i>Sporobolus airoides</i> sacaton grass		X	X	X	X	X	X	X		X	X
<i>Symphototrichum expansum</i> southwestern annual saltmarsh aster	<i>Aster subulatus</i> saltmarsh aster	X	X		X			X			
<i>Tamarix ramosissima</i> saltcedar		X	X	X	X	X	X	X			X
<i>Tolypella</i> sp.		X	X	X	X						
<i>Typha domingensis</i> southern cattail		X	X	X	X	X	X	X			X

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species
* indicates identification is tentative due to the absence of reproductive structures

Scientific Name Common Name	Recent Synonymy	P1	P2	P3	C1	C2	C3	W1	S	ACW	LC
<i>Viguiera annua</i> annual goldeneye		X	X		X			X		X	
<i>Washingtonia robusta</i> Washington fan palm		X	X	X	X	X	X	X	X		
<i>Wisizenia refracta</i> spectacle fruit	<i>Wisizenia refracta</i> jackass clover				X			X			
<i>Xanthium strumarium</i> rough cocklebur			X	X	X		X	X			
<i>Ziziphus obtusifolia</i> lotebush		X			X			X	X		X

P1-Pond One P2-Pond Two P3-Pond Three C1-Channel One C2-Channel Two C3-Channel Three
W1-Wetland One S-Agua Caliente Spring ACW-Agua Caliente Wash LC-La Cebadilla Property

Boldface type indicates non-native species

* indicates identification is tentative due to the absence of reproductive structures

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names

AMARANTHACEAE

Amaranthus fimbriatus fringed amaranth

APIACEAE

Eryngium sparganophyllum Arizona eryngo

ARECACEAE

Washingtonia robusta Washington fan palm

ASTERACEAE

Almutaster pauciflorus alkali marsh aster

Baccharis salicifolia mule's fat

Baccharis sarothroides desert broom

Cirsium sp. thistle

Gnaphalium chilensis cotton batting

Helianthus annuus common sunflower

Hymenoclea salsola burrobrush

Isocoma tenuisecta burroweed

Solidago sp. goldenrod

Symphytotrichium expansum southwestern annual saltmarsh aster

Viguiera annua annual goldeneye

Xanthium strumarium rough cocklebur

BIGNONIACEAE

Chilopsis linearis desert willow

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names, continued.

BRASSICACEAE

Lepidium sp. pepperwort

CACTACEAE

Opuntia spp. prickly pear

CAPPARACEAE

Polansia dodecandra ssp. sandyseed clammyweed
trachysperma

Wislizenia refracta spectacle fruit

CHARACEAE

Chara sp.* stonewort

CHENOPODIACEAE

Atriplex canescens fourwing saltbush

Atriplex semibaccata **Australian saltbush**

Bassia hyssopifolia **fivehorn smotherweed**

Salsola tragus **prickly Russian thistle**

CONVOLVULACEAE

Evolvulus arizonicus wild dwarf morning-glory

CUCURBITACEAE

Cucurbita digitata coyote gourd

CYPERACEAE

Cyperus strigosus strawcolored flatsedge

*Eleocharis acicularis** needle spikerush

*Eleocharis parishii** Parish's spikerush

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names, continued.

<i>Eleocharis rostellata</i>	beaked spikerush
<i>Schoenoplectus acutus</i>	hardstem bulrush
<i>Schoenoplectus americanus</i>	chairmaker's bulrush
EPHEDRACEAE	
<i>Ephedra trifuca</i>	longleaf jointfir
EUPHORBIACEAE	
<i>Chamaesyce albomarginata</i>	whitemargin sandmat
FABACEAE	
<i>Caesalpinia gilliesii</i>	bird-of-paradise
<i>Parkinsonia aculeata</i>	Jerusalem thorn
<i>Prosopis velutina</i>	velvet mesquite
GENTIANACEAE	
<i>Centaurium calycosum</i>	Arizona centaurium
<i>Eustoma exaltatum</i>	catch-fly gentian
JUNCACEAE	
<i>Juncus mexicanus</i>	Mexican rush
<i>Juncus torreyi</i>	Torrey's fruit
IRIDACEAE	
<i>Sisyrinchium demissum</i>	stiff blue-eyed grass
MALVACEAE	
<i>Gossypium thurberi</i>	Thurber's cotton
<i>Sphaeralcea ambigua</i>	desert globemallow

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names, continued.

NAJADACEAE

Najas marina spiny naiad

NYCTAGINACEAE

Boerhavia coccinea red spiderling

OLEACEAE

Fraxinus velutina velvet ash

ONAGRACEAE

Guara parviflora lizardtail

PLATANACEAE

Platanus wrightii Arizona sycamore

POACEAE

Aristida purpurea purple threeawn

***Bromus rubens* red brome**

Chloris virgata feather fingergrass

***Cynadon dactylon* Bermudagrass**

Distichlis spicata inland saltgrass

***Echinochloa colona* jungle rice**

Eragrostis cilianensis stinkgrass

***Eragrostis lehmanniana* Lehmann lovegrass**

Leptochloa panicea ssp. *brachiata* mucronate sprangletop

Muhlenbergia asperifolia alkali muhly

Panicum obtusum vine mesquite

Papphorum vaginatum pappusgrass

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names, continued.

<i>Paspalum dilatatum</i>	dallisgrass
<i>Polypogon monspeliensis</i>	annual rabbitfoot grass
<i>Sporobolus airoides</i>	alkali sacaton
POLYGONACEAE	
<i>Eriogonum wrightii</i>	bastardsage
POTAMOGETONACEAE	
<i>Potamogeton pectinatus</i>	pondweed
RANUNCULACEAE	
<i>Clematis ligusticifolia</i>	western white clematis
RHAMNACEAE	
<i>Ziziphus obtusifolia</i>	lotebush
SALICACEAE	
<i>Populus fremontii</i>	Fremont cottonwood
<i>Salix gooddingii</i>	Goodding's willow
SAURURACEAE	
<i>Anemopsis californica</i>	yerba mansa
SOLANACEAE	
<i>Datura wrightii</i>	sacred thornapple
<i>Nicotiana glauca</i>	tree tobacco
TAMARICACEAE	
<i>Tamarix ramosissima</i>	saltcedar
TYPHACEAE	
<i>Typha domingensis</i>	southern cattail

Agua Caliente Park Common Wetland and Aquatic Species Plant List Organized by Family Names, continued.

ULMACEAE

<i>Celtis pallida</i>	spiny hackberry
<i>Celtis laevigata</i> var. <i>reticulata</i>	netleaf hackberry

Boldface type indicates non-native species

* indicates identification is tentative due to the absence of reproductive structures

APPENDIX B

**WILDLIFE SPECIES DETECTED IN THE STUDY AREA
OCTOBER 2001**

This list includes wildlife species observed or detected through sign in the study area. It does not represent a comprehensive summary of all species that may occur in the subject area.

Scientific Name

Common Name

Birds

Grebes

Podilymbus podiceps

pied-billed grebe

Bitterns and Herons

Ardea herodias

great blue heron

Butorides virescens

green heron

American Vultures

Cathartes aura

turkey vulture

Swans, Geese and Ducks

Anas platyrhynchos

mallard

Aythya collaris

ring-necked duck

Kites, Hawks, and Eagles

Pandion haliaetus

osprey

Accipiter cooperii

Cooper's hawk

Buteo jamaicensis

red-tailed hawk

Caracaras and Falcons

Falco sparverius

American kestrel

This list includes wildlife species observed or detected through sign in the study area. It does not represent a comprehensive summary of all species that may occur in the subject area, continued..

Scientific Name	Common Name
Pigeons and Doves	
<i>Zenaida macroura</i>	mourning dove
Cuckoos, Roadrunners, and Allies	
<i>Geococcyx californianus</i>	greater roadrunner
Hummingbirds	
<i>Calypte anna</i>	Anna's hummingbird
Kingfishers	
<i>Ceryle alcyon</i>	belted kingfisher
Woodpeckers	
<i>Merlanerpes uropygialis</i>	Gila woodpecker
<i>Colaptes auratus</i>	northern flicker
Silky- Flycatchers	
<i>Phainopepla nitens</i>	phainopepla
Jays, Crows, and Ravens	
<i>Corvus corax</i>	common raven
Verdin	
<i>Auriparus flaviceps</i>	verdin
Wrens	
<i>Campylorhynchus brunneicapillus</i>	cactus wren

This list includes wildlife species observed or detected through sign in the study area. It does not represent a comprehensive summary of all species that may occur in the subject area, continued..

Scientific Name	Common Name
Mockingbirds, Thrashers, and allies	
<i>Toxostoma curvirostre</i>	curve-billed thrasher
Emberizids	
<i>Zonotrichia leucophrys</i>	white-crowned sparrow
Cardinals, Salators and Allies	
<i>Cardinalis cardinalis</i>	northern cardinal
<i>Cardinalis sinuatus</i>	pyrrhuloxia
Blackbirds, Meadowlarks, and Orioles, and Allies	
<i>Quiscalus mexicanus</i>	great-tailed grackle
Eringilline and Cardueline finches	
<i>Carpodacus purpureus</i>	house finch
<i>Carduelis psaltria</i>	lesser goldfinch
Old World Sparrows	
<i>Passer domesticus</i>	house sparrow
Mammals	
<i>Canis latrans</i>	coyote
<i>Neotoma albigula</i>	white-throated wood rat
<i>Odocoileus hemionus</i>	mule deer
<i>Procyon lotor</i>	raccoon
<i>Sylvilagus audubonii</i>	desert cottontail
<i>Tayassu tajacu</i>	collard peccary
<i>Thomomys</i> spp.	pocket gopher

This list includes wildlife species observed or detected through sign in the study area. It does not represent a comprehensive summary of all species that may occur in the subject area, continued..

Scientific Name

Common Name

Urocyon cinereoargenteus

gray fox

Reptiles

Apalone spiniferus

softshell turtle

Callisaurus draconoides

zebra-tailed lizard

Cnemidophorus tigris

western whiptail

Sceloporus magister

desert spiny lizard

Fish

Gambusia affinis

mosquitofish

Lepomis macrochirus

bluegill

Micropterus salmoides

largemouth bass

APPENDIX C

**PHOTOGRAPHS OF THE STUDY AREA
OCTOBER 2001**



Figure C-1. Agua Caliente Spring.



Figure C-2. East shore of Pond One.



Figure C-3. Pond Two with view of habitat island.



Figure C-4. Pond Three with view of habitat island.



Figure C-5. Channel One near pedestrian path.



Figure C-6. View of Wetland One.



Figure C-7. Arizona eryngo (*Eryngium sparganophyllum*)

This species was collected at Aqua Caliente Ranch in 1908 by botanist J.J. Thomber. This rare plant, which occurs only in Arizona, New Mexico and portions of Mexico, was believed to be extirpated from Pima County in the mid-1900s when Pantano drainage dried. Recent surveys funded by PCFCD documented the presence of a large population of this plant at the La Cebadilla Property. The meadow at La Cebadilla supports several other rare species that typically inhabit cienegas; these include alkali marsh aster, stiff blue-eyed grass, and catch-fly gentian.

This species was collected at Aqua Caliente Ranch in 1908 by botanist J.J. Thornber. This rare plant, which occurs only in Arizona, New Mexico and portions of Mexico, was believed to be extirpated from Pima County in the mid-1900s when Pantano drainage dried. Recent surveys funded by PCFCD documented the presence of a large population of this plant at the La Cebadilla Property. The meadow at La Cebadilla supports several other rare species that typically inhabit cienegas; these include alkali marsh aster, stiff blue-eyed grass, and catch-fly gentian.

APPENDIX D

**WETLAND PLANT SURVEY FORMS
OCTOBER 2001**

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: P-1 Biologists: A Furgason
10/9/01 P. Titus

Survey Segment

Description all edges of P-1, edges of cattail islands, and
edges of duck island

Typical Water Depth: > 1m Substrates: silty clay loam, muck, organics

Dominant Plants =*

Canopy: Washingtonia filifera*, Salix gooddingii*, Populus fremontii*
Fraxinus velutina*

Subcanopy: Washingtonia filifera*, Prosopis juliflora - edges
Fraxinus velutina*

Shrubs: scattered Tamarix, Baccharis sarothoides*, Zizyphus*
Prosopis juliflora, Isocoma tenuicarpa - higher places

Herbaceous: Scirpus americanus*, Typha domingensis*
Aster subulatus, Helianthus annuus, Distyclus spicata

Cynodon dactylon, Sporobolus airoides, Eleocharis parisi
Eleocharis acicularis* thick mat at edge of pond - looks alot

Aquatics: Najas marina - small patches like HWU!
Chara spp., Tolypella spp. - trace amounts

Other: Isocoma on berm edges

Photo

#s: _____

Huachuca Water Umbel Present??? Yes / No (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: habitat for for HWU due to constant grazing by
ducks and trampling by park visitors

Additional notes/ species / wildlife sightings:

Osprey, Am widgeton, ringneck duck, mallards, coots
great blue heron
pair of green-backed herons
lots of Non-native fish

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: P-2 Biologists: P. Titus
10/9/01 A. Furgason

Survey Segment
Description all edges of P2, edges of island

Typical Water Depth: > 1 m. Substrates: sandy, silty clay, loam

Dominant Plants = *

Canopy: Washingtonia filifera*, Populus fremontii*
a few Prosopis*, one Salix gooddingii

Subcanopy: mostly lacking; a few Washingtonia*, Populus*
Tamarix

Shrubs: mostly lacking; a few Baccharis sarothoides*, Tamarix
Koeleria strumarium*, Atriplex canescens*, Isocoma*

Herbaceous: Scirpus americanus*, Typha domingensis*
Cyperus strigosus*, Eleocharis parishii*, Eleocharis rostrata

Viguiera annua, Cynodon dactylon, Aster subulatus
Sporobolus airoides, Pappophorum vaginatum

Aquatics: 2 species of algae; one is Chara; other is Tolypella*
small fragments of Najas marina*

Photo
#s: _____

Huachuca Water Umbel Present??? Yes / No (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel
habitat: HWU habitat probably poor due to abrupt change
in microtopography at pond & island edges
a few small potential sites may exist

Additional notes/ species / wildlife sightings:
ring necked duck, great blue heron, belted Kingfisher
Cactus wren bathing, pied-billed grebe

vegetation is thicker than that surrounding P3

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: P-3 Biologists: P. Titus
10/9/01 A. Ferguson

Survey Segment

Description all edges of P-3, edges of habitat peninsula &
cattail islands

Typical Water Depth: > 1 m. Substrates: silty clay loam, muck, organics

Dominant Plants =*

Canopy: widely scattered Prosopis velutina, Populus fremontii,*
Washingtonia filifera* Salix goodii*⁺

Subcanopy: Prosopis velutina,* Populus fremontii,* Washingtonia
filifera*

Shrubs: Small scattered Tamarix sp.,⁺ Kanthusa strummaria
Isocoma on berm edges, Atriplex canescens*

Herbaceous: Sarcobatus airoides, Typha domingensis*, Scirpus acutus
Scirpus americanus*, Eleocharis parishii*^{scattered patches}
Leptochloa filiformis, Cyperus strigosus* Cyrtodromus diactylon
Isorhiza tenuisecta^{upland} edges, lots of tiny cattail seedlings, Salsola

Aquatics: Tolypella spp.*

→ Also! Centaurea californica

Photo

#s:

Huachuca Water Umbel Present??? Yes / No (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: poor habitat for HWU due to abrupt microtopography
in most places

much of the shore line is barren. Substrate
one spot near east end near channel inlet has potential - flat area

Additional notes/ species / wildlife sightings: w/ organic substrate

lots of vegetation around and within pond has been
recently clipped; much of shore line is barren

coots, mallards

great blue heron

raccoon tracks abundant

phalarope

zebra tail

habitat island & peninsula also has scattered mesquite, palm
and cottonwood

Include additional notes and sketch on back of form

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: C-1 Biologists: Alice Ferguson
10/19/01 Priscilla Titus

Survey Segment

Description narrow channel leading from P-1 to east end of P-3
channel is interrupted in places and/or diverted by pipes

Typical Water Depth: 5cm Substrates: gravelly sand; silty clay loam

Dominant Plants =*

Canopy: scattered loc: Prosopis velutina*, Washingtonia filifera*
Other areas none

Subcanopy: scattered loc: Prosopis velutina*, Washingtonia filifera*
Other areas none

Shrubs: scattered young Prosopis*, Washingtonia*, Populus*, Viguiera*
scattered Tanacetum seedlings/saplings, Xanthoxylum, Strumarium annuus

Herbaceous: Cyperus strigosus*, Aster subulatus, Cynodon dactylon, Polypogon
Sporobolus airoides*, Scirpus americanus*, Typha domingensis*, Chloris virgata

Eleocharis parviflora*, Echinochloa colona, Panicum obtusum
Viguiera annua, Anemopsis californica, Distichlis spicata, Leptochloa filiformis

Aquatics: Potamogeton pectinatus*, Chara spp., Tolyrella spp.*
Najas marina*, platatum

also present: Paspalum spp., Juncus torreyi, Gnaphalium chilensis Basia
hyssopifolia

Panicum obtusum, Nicotiana glauca, Lepidium spp., Cirsium spp.
 Photo Isocoma at edges, Guara parviflora, Eragrostis lehmanniana } near path
#s: #1, 2 Eragrostis chillinensis } near path

Amaranthus fimbriatus, Atriplex semibaccata, Baccharis Boehavia coccinea
Sarothra
 Huachuca Water Umbel Present??? Yes / NO (circle one) If yes, fill out population documentation form and attach.

Pappophorum vaginatum, W. glizenia refracta Zizyphus at edges
Salsola
 Description of potential Huachuca water umbel Sphaeralcea ambigua Clematis ligustifolia
nearby path

habitat: small off-channel pockets w/ silty clay loam substrates
and low inter-specific competition are present along portions
of the channel
probably the best habitat in the park

Additional notes/ species / wildlife sightings:

- lots of aquatic snails, bluegill, tilapia
- great blue heron, Cooper's hawk, raven, turkey vulture, Phainopepla
- fox tracks curved-billed thrasher
- deer tracks Common yellowthroat
- ♂ vermilion flycatcher
- osprey
- green-backed heron
- coonote scat

Note: some one has been pulling Eleocharis from stream channel,
esp between P-1 & P-2 near path and west of P-2
Includ additional notes and sketch on back of form

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: C-2 Biologists: P. Titus
10/9/01 A. Ferguson

Survey Segment

Description ditch that runs parallel to Rover Rd then extends
north from park to W-1

Typical Water Depth: 0 Substrates: silty clay loam

Dominant Plants = *

Canopy: Washingtonia filifera*, Prosopis velutina*, Populus fremontii*

Subcanopy: Washingtonia filifera*, Prosopis velutina*, Populus fremontii*

Shrubs: scattered Tamarix*, Atriplex canescens*
Isoetes at edge*

Herbaceous: dead Typha & Scirpus (previous years growth) in park
Cynodon dactylon*, Eragrostis cilinensis*, Sporobolus airoides*
Guara parviflora

Anemopsis - trace amount. approaching from Newberry W1

Aquatics: none

Photo

#s: _____

Huachuca Water Umbel Present??? Yes / (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: Not appropriate habitat for HWU due to
intermittent hydrology

Additional notes/ species / wildlife sightings:

Gila woodpecker
Whiptail

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: C-3 Biologists: P. Titus
10/9/01 A. Ferguson

Survey Segment
Description narrow channel that flows from P3 west toward
park boundary; eventually joins Agua Caliente wash?

Typical Water Depth: 0 Substrates: sandy silty clay loam w/ salt
deposits

Dominant Plants = *
Canopy: Prosopis velutina*, Washingtonia felifera*, near pond
Populus fremontii*
Subcanopy: edges: Larrea tridentata, Prosopis velutina*

Shrubs: edges: Isocoma tenuiseeta,
Tamox*, Baccharis sarothoides*, Xanthium strumarium

Herbaceous: Typha domingensis, Sporobolus airoides*, Scirpus americanus
Palafoxia monosperma, Cynodon dactylon,
Pappophorum vaginatum, Panicum obtusum

Aquatics: None

Photo
#s: _____

Huachuca Water Umbel Present??? Yes / No (circle one) *If yes, fill out population documentation form and attach.*

Description of potential Huachuca water umbel
habitat: not appropriate due to intermittent hydrology

Additional notes/ species / wildlife sightings:

Include additional notes and sketch on back of form

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 · Survey Segment: Spring Biologists: P. Titus
10/9/01 A. Ferguson

Survey Segment

Description Spring begins w/pool at 10 in concrete culvert &
flows to P-1

Typical Water Depth: 20-25cm Substrates: gravelly sandy, sandy silty loam

Dominant Plants

Canopy: Washingtonia filifera*, Populus fremontii*, Salix gooddingii*

Subcanopy: Washingtonia*, Prosopis velutina*, Celtis reticulata*

Shrubs: Zizyphus obtusifolia*, Celtis reticulata*, Prosopis velutina

100cm Celtis pallida - in forest surrounding

Herbaceous: very little; Cynodon dactylon*, Washingtonia seedlings*
dried up Lepidium in some spots

Aquatics: none

Other: agaves scattered about on upland areas surrounding spring

Photo

#s: _____

Huachuca Water Umbel Present??? Yes / No (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: habitat poor in H₂O due to sandy substrate & abrupt
microtopography; no off-channel habitat; edges of spring
and channel devastated by visitor's walking etc.
heavy shading

Additional notes/ species / wildlife sightings:

tilapia?

Gila wip

lots of aquarium fish: tiger oscar, goldfish

lots of mallards

Green-backed heron

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Dates 10/8/01 Survey Segment: W-1 Biologists: Alice Ferguson
10/9/01 Priscilla Titus

Survey Segment

Description Shallow alkaline wetland - some areas with berms
some areas lacking vegetation - cracked mud only
mineral/salt deposits

Typical Water Depth: 0 Substrates: Silty clay loam in many areas
small shallow puddle in center = 2-3 cm deep

Dominant Plants = *

Canopy: Scattered Washingtonia*, Populus*, Prosopis velutina*
Fraxinus velutina*

Subcanopy: Scattered Washingtonia*, Populus*, Prosopis velutina*
Fraxinus velutina*

Shrubs: scattered Prosopis*, Atriplex canescens*, Baccharis sarothoides*
Xanthium strumarium*, scattered Tamarix sp.

Herbaceous: Typhadomingensis*, Scirpus americanus*, Distichlis spicata*
Anemopsis californica*, Sporobolus airoides*, Cynodon dactylon*

Eleocharis parishii*, Cyperus strigosus, Vilgertia refracta, Viguiera annuus
Helianthus annuus, unknown aster - collected, Aster subulatus

Aquatics: None at present; look in another season to
document AZ hidden diversity

Other: mistletoe in mesquite; scattered Saguaro on hummocks

Photo Ziziphus zacoma on edges, Guara parviflora scattered opuntia

#s: 3, 4, 5

Huachuca Water Umbel Present??? Yes / (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: most of this wetland is too dry at present but
appears that in previous years it is wetter.

Anemopsis is dried up.

Additional notes/ species / wildlife sightings:

Gila w/p, Pyrrhuloxia
several coyote skulls

rodent skulls under palm - probably owl roost
palm skirts = great wildlife shelters

Copper's hawk
spiny lizard on palm trunk

Cholla spp scattered about in drier areas &
grey thorn on berms

Include additional notes and sketch on back of form

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Date: 10/23/01 Survey Segment: ACW Biologists: P. Titus
J. Titus (volunteer)

Survey Segment
Description Portion of Agua Caliente Wash owned by PCFCD

Typical Water Depth: 0 Substrates: loose sand & gravel, cobbles, boulders

Dominant Plants*

Canopy: Mesquite bossue*, Platimus*, Populus*, a few ash at edge
Mexican Palo Verde

Subcanopy: mostly lacking, some elements of Yucca

Shrubs: Chilopsis linearis*, Baccharis sarothoides*, Baccharis salicifolia

Viguiera annua* wild cotton, Ephedra, Bird of paradise, Chene bush

Herbaceous: Clammy weed, Sporobolus*, Bromus*, Coccinea*, Chamaecrista*

Eriogonum wrightii, Amaranthus fimbriatus, Salsola, Kali, Chloris virgata

Aristida purpurea, Gnaphalium, Bermuda grass, Lehman's 1-grass,

Bromus tubens, Coyote gourd, Datura, Sol. d. sp. wild morning glory

Aquatics: None

Photo

#s: _____

Huachuca Water Umbel Present??? Yes / No (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: not appropriate due to lack of hydrology and
sandy substrate

Additional notes/ species / wildlife sightings:

Agua Caliente Park
Huachuca Water Umbel Survey and Wetland Plant Community Mapping
Year 2001

Survey Date: 10/22/01 Survey Segment: LC Biologists: P. T. & S.

Survey Segment

Description all wetland habitat at PCFCD's La Cebadilla Property

Typical Water Depth: 2-6 in Substrates: Silt/clay loam, muck

mineral/silt deposits in many areas

Dominant Plants =*

Canopy: Prosopis velutina - on edges, Populus fremontii - a few - most on property to N

Subcanopy: Prosopis velutina - on edges

Shrubs: Baccharis sarothoides* Isocoma tenuisecta* in higher areas
Tamarix spp* a couple of Scaevola on berm

Herbaceous: Distichlis spicata, Typha domingensis* Scirpus americanus*
Anemopsis californica*, Eleocharis rostellata*, Sporobolus
Eleocharis rostellata, Alkali marsh*

Eleocharis spp. - collected, unknown grass collected, unknown plant

Aquatics: unknown green algae - small amount

Photo

#s: _____

Huachuca Water Umbel Present??? Yes / (circle one) If yes, fill out population documentation form and attach.

Description of potential Huachuca water umbel

habitat: Opportunities limited due to alteration of hydrology
Some marginal habitat in cattail & bulrush stand but
interspecific competition is very high

Additional notes/ species / wildlife sightings:

Meadow spp: Eryngium sparganophyllum* Sisyrinchium dimissum* rare
Sporobolus airoides*, Carex dactylon*, Eustoma exaltatum
unknown purple aster = Aster paniculatus, Distichus spicatus*
Juncus mexicanus* Alkalia malhi*
Eleocharis - small clumps on sally
Scattered Opuntia

rare?

Include additional notes and sketch on back of form

Brown water

note: determined on private property at site

